

**ARMY**

**TM 9-1220-252-12&P**

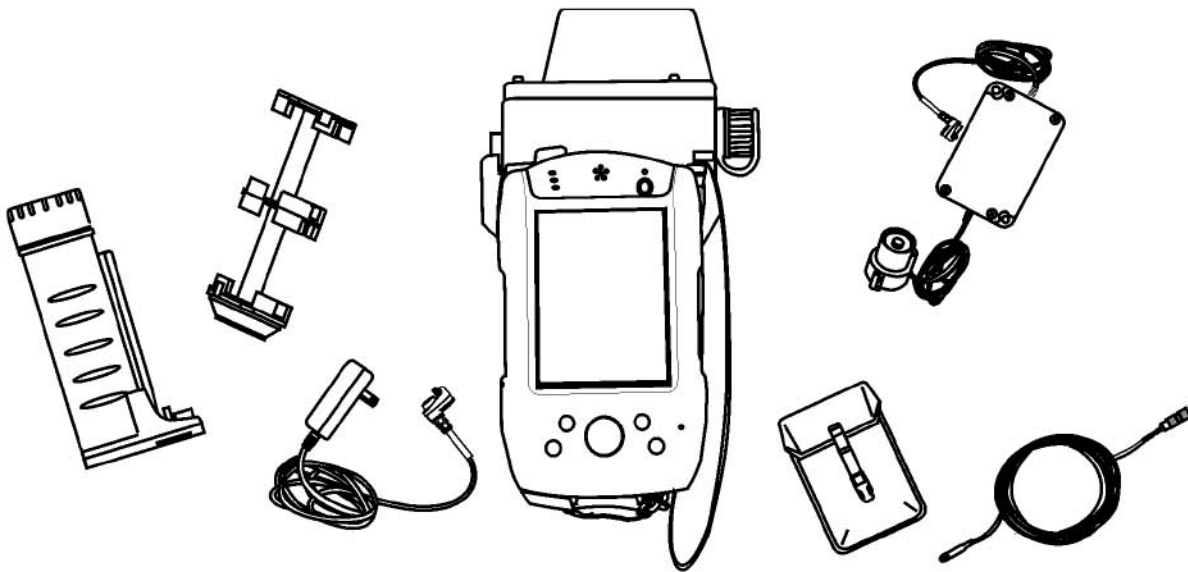
**MARINE CORPS TM 11042A-12&P**

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**TECHNICAL MANUAL**

**OPERATOR'S AND UNIT MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST) FOR**

**LIGHTWEIGHT HANDHELD MORTAR  
BALLISTIC COMPUTER (LHMBC), M32  
NSN 7021-01-521-1611**



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**HEADQUARTERS, DEPARTMENT OF THE ARMY  
AND UNITED STATES MARINE CORPS**

**JULY 2005**

## WARNING SUMMARY

The Lithium-sulfur dioxide (Li-SO<sub>2</sub>) battery pack BA5800 and the rechargeable BB2800 CANNOT be used to charge the LHMBC because the battery adapter may rupture causing injury to personnel due to battery out gasing.

Lithium batteries are potentially hazardous if misused or tampered with. To prevent injury to personnel or equipment damage, the batteries should not be heated, crushed, punctured, mutilated, opened, disassembled, short circuited, recharged, or used under conditions exceeding the operational condition. If heated or disposed in a fire, lithium batteries can explode.

Do not incinerate or heat batteries. Batteries could rupture.

Do not mix and use different types of batteries and/or new and used batteries. Batteries could rupture or leak.

Use ONLY the 1.5/1.8 volt AA batteries specified herein.

NEVER attempt to charge non-rechargeable batteries, such as the L91 Lithium batteries. Batteries could rupture or leak.

Use caution when changing the AA batteries if the battery adapter has been used. The AA batteries can get very HOT.

To reduce the risk of electrical shock, do not spray liquid directly on the screen or allow excess liquid to drip inside the LHMBC. Keep all ports covered, especially the SD slot.

## CAUTION SUMMARY

Do not use the sharp end of the stylus or any other sharp item to push on a LHMBC button or the button switch inside the LHMBC may break.

Do not carry loose batteries in a pocket with metal objects. The batteries may short circuit generating high heat.

Do not use any cleaning solvent on the LHMBC that may damage the display screen.



CHANGE  
NO. 1

HEADQUARTERS, DEPARTMENT OF THE ARMY  
AND UNITED STATES MARINE CORPS  
WASHINGTON, DC, 15 DECEMBER 2005

TECHNICAL MANUAL

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TM 9-1220-252-12&P, 20 July 2005, is updated as follows:

1. File this sheet after the Warning Summary for reference.
2. New or updated text is indicated by a vertical bar in the outer margin of the page.
3. Added or changed illustrations are indicated by a vertical bar in the outer margin of the page.
4. Insert DA Form 2399-R after DA Form 2028.
5. Remove old pages and insert new pages as indicated below.

Remove Pages

a/b blank  
A/B blank  
i and ii  
Index-3 thru Index-10  
None

Insert Pages

a/b blank  
A and B  
i and ii  
Index-3 thru Index-10  
DA Form 2399-R

6. Replace the following work packages with their revised version.

Work Package Number

0001 00  
0005 00  
0006 00  
0007 00  
0015 00  
0017 00  
0021 00  
0022 00  
0023 00  
0024 00  
0025 00  
0026 00  
0027 00  
0028 00  
0029 00  
0030 00  
0032 00  
0034 00  
0035 00  
0040 00  
0043 00  
0045 00  
0047 00  
0048 00  
0049 00  
0052 00  
0056 00

7. Add the following new work packages.

Work Package Number


0026 01

By Order of the Secretary of the Army and Commandant of the Marine Corps:

PETER J. SCHOOMAKER  
*General, United States Army*  
*Chief of Staff*

JAMES M. RIPLEY  
Program Manager, Fire Support Systems  
Marine Corps Systems Command

Official:

  
SANDRA R. RILEY  
*Administrative Assistant to the*  
*Secretary of the Army*  
0523605

INSERT LATEST CHANGED PAGES/WORK PACKAGES. DESTROY SUPERSEDED DATA.

## LIST OF EFFECTIVE PAGES/WORK PACKAGES

NOTE: The portion of text affected by the changes is indicated by a vertical line in the outer margins of the page. Changed illustrations are indicated by a vertical line in the outer margins of the page.

Date of issue for the original manual and changed pages/work packages are:

Original 20 Jul 05  
Change 1 15 Dec 05

### TOTAL NUMBER OF PAGES FOR FRONT AND REAR MATTER IS 30 AND TOTAL NUMBER OF WORK PACKAGES IS 61, CONSISTING OF THE FOLLOWING:

Page/WP No.	*Change No.	Page/WP No.	*Change No.
Title	0	WP 0026 01 (6 pgs)	1
a	1	WP 0027 00 (4 pgs)	1
b blank	0	WP 0028 00 (8 pgs)	1
A and B	1	WP 0029 00 (4 pgs)	1
i	0	WP 0030 00 (4 pgs)	1
ii	1	WP 0031 00 (2 pgs)	0
iii and iv	0	WP 0032 00 (2 pgs)	1
Chp 1 title page	0	Chp 3 title page	0
WP 0001 00 (10 pgs)	1	WP 0033 00 (2 pgs)	0
WP 0002 00 (4 pgs)	0	WP 0034 00 (2 pgs)	1
WP 0003 00 (2 pgs)	0	WP 0035 00 (16 pgs)	1
Chp 2 title page	0	Chp 4 title page	0
WP 0004 00 (4 pgs)	0	WP 0036 00 (2 pgs)	0
WP 0005 00 (8 pgs)	1	WP 0037 00 (8 pgs)	0
WP 0006 00 (8 pgs)	1	Chp 5 title page	0
WP 0007 00 (4 pgs)	1	WP 0038 00 (2 pgs)	0
WP 0008 00 (2 pgs)	0	WP 0039 00 (16 pgs)	0
WP 0009 00 (2 pgs)	0	WP 0040 00 (14 pgs)	1
WP 0010 00 (4 pgs)	0	Chp 6 title page	0
WP 0011 00 (4 pgs)	0	WP 0041 00 (2 pgs)	0
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WP 0025 00 (4 pgs)	1	WP 0053 00 (2 pgs)	0
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\*Zero in this column indicates an original page.

LIST OF EFFECTIVE PAGES/WORK PACKAGES - Continued

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WP 0056 00 (8 pgs)	1		
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WP 0059 00 (2 pgs)	0		
WP 0060 00 (2 pgs)	0		
Index-1 thru Index-3	0		
Index-4 thru Index-10	1		

\*Zero in this column indicates an original page.

HEADQUARTERS, DEPARTMENT OF THE ARMY  
AND UNITED STATES MARINE CORPS  
WASHINGTON, DC, 20 JULY 2005

TECHNICAL MANUAL

OPERATOR'S AND UNIT MAINTENANCE MANUAL  
(INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST)

LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER (LHMBC), M32  
NSN 7021-01-521-1611

**REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS**

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications) through the Internet on the Army Electronic Product Support (AEPS) website. The Internet address is <http://aeeps.ria.army.mil>. DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or E-mail your letter or DA Form 2028 direct to: AMSTA-LC-LMIT/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The email address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

Marine Corps users submit NAVMC 10772 to: Commander, Marine Corps System Command, Attn: PM FSS, 2200 Lester Street, Quantico, VA 22134-6050. Recommended changes may be sent by fax (DSN 378-3550, Commercial 703-432-3550), or by naval message (in any format, only one publication per message). Submit notice of discrepancies or suggested changes on a NAVMC 10772. The NAVMC may be submitted via the Internet using website <https://pubs.ala.usmc.mil/navmc>, the NAVMC 10772 Tracking Program, and following instructions provided. It may also be submitted by electronic mail to [mbmatcommarlogbases@logcom.usmc.mil](mailto:mbmatcommarlogbases@logcom.usmc.mil), or by mailing paper copy NAVMC 10772 in an envelope addressed to Commander, Marine Corps Systems Command, Attn: Assistant Commander Acquisition and Logistics (LOG/TP), 814 Radford Blvd, Suite 20343, Albany, Georgia 31704-0343.

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## HOW TO USE THIS MANUAL

**GENERAL**

This manual contains all descriptive, operational, troubleshooting and maintenance information required to operate and maintain the M32 LHMBC.

**CONTENT OF MANUAL**

This manual is divided into 8 chapters:

- Chapter 1, General Information, Equipment Description, and Theory of Operation
- Chapter 2, Operator Instructions
- Chapter 3, Operator Troubleshooting Procedures
- Chapter 4, Unit Troubleshooting Procedures
- Chapter 5, Operator Maintenance Instructions
- Chapter 6, Unit Maintenance Instructions
- Chapter 7, Parts Information
- Chapter 8, Supporting Information

## HOW TO ACCESS INFORMATION QUICKLY

The chapters are divided into work packages (WP). Each WP is assigned a six digit sequence number. The sequence numbers run consecutively throughout the manual. The first four digits of the WP sequence number are based on the location of the WP (e.g., 0005 00 is the fifth WP). The last two digits are reserved for WPs added after initial publication (e.g., 0005 01 is a WP added between WP 0005 00 and 0006 00). WP page numbers are numbered consecutively and consist of the WP sequence number followed by -1, -2, -3, etc. (e.g., 0005 00-1, 0005 00-2, etc.).



## **CHAPTER 1**

# **GENERAL INFORMATION, EQUIPMENT DESCRIPTION, AND THEORY OF OPERATION FOR LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**GENERAL INFORMATION**

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## **SCOPE**

This manual gives users the information they need to operate the Lightweight Handheld Mortar Ballistic Computer (LHMBC) under usual and unusual conditions. This manual also contains the data users need to check the LHMBC for proper operation and to keep it serviceable.

Type of Manual: Operator and Unit Maintenance.

Model Number and Equipment Name: M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC).

Purpose of Equipment: The M32 LHMBC is used to rapidly compose, edit, store and display data, and provides improved accuracy in processing and communicating fire direction commands.

## **MAINTENANCE FORMS, RECORDS, AND REPORTS**

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, Functional Users Manual for The Army Maintenance Management System (TAMMS).

Marine Corps personnel refer to the on-line MCPDS or Marine Corps Stocklist SL-1-2 Index of Technical Publications. Marine Corps users/maintainers will use the forms, records, and procedures used for equipment maintenance as prescribed by TM 4700-15/1, Ground Equipment Record Procedures.

## **REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)**

### **Army**

If your M32 LHMBC needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: ATTN: AMSTA-AR-QAW-C, TACOM-ARDEC, 1 Rock Island Arsenal, Rock Island, IL 61299-7300. (Fax: DSN 793-6653, Commercial (309) 782-6653; E-mail: [qawqdrs@ria.army.mil](mailto:qawqdrs@ria.army.mil).) We will send you a reply.

### **Marine Corps**

If the M32 LHMBC has been damaged during shipment, if shipment is incomplete, if incorrect item is received, or if incorrect quantity of Marine Corps Supply System Responsibility (SSR), Marine Corps Collateral Material (CM), or Marine Corps Using Unit Responsibility (UUR) items are received, submit a Supply Discrepancy Report SF 364 in accordance with SECNAVINST 4355.18A.

Marine Corps personnel are encouraged to submit SF 368 in accordance with MCO 4855.10 (Quality Deficiency Report). Submit the PQDR to Marine Corps LogCom Command Element, Attn: Quality Assurance Office (L15), 814 Radford Blvd, Ste 20330, Albany, GA 31704-0330. To electronically submit the PQDR, use website <http://www.logcom.usmc.mil/pqdr/ezpqdr.asp>. This site can be used to submit the PQDR, answer questions on how to correctly fill out the form, and to track the status once submitted.

If your M32 LHMBC needs improvements which relate directly to savings in man-hours, materials, supplies, equipment, funding, or increased effectiveness in carrying out the programs or missions of your unit/command, U.S. Marine Corps units/commands refer to MCO 1650.17F, USMC Military Incentives Award Program.

## CORROSION PREVENTION AND CONTROL (CPC)

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements can be made to prevent the problem in future items.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using SF 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem.

The form should be submitted to:   ATTN: AMSTA-AR-QAW-C  
  TACOM-ARDEC  
  1 Rock Island Arsenal  
  Rock Island, IL 61299-7300  
  Fax: DSN 793-6653, Commercial (309) 782-6653  
  E-mail: qawqdrs@ria.army.mil

## DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

### Army

Army procedures and materials used for the destruction of the M32 LHMBC in order to prevent enemy use are in TM 750-244-7.

In an emergency (e.g., imminent capture, etc.), ZEROIZE the M32 LHMBC. See WP 0006 00.

### Marine Corps

Marine Corps users destroy the M32 LHMBC by ZEROIZING in accordance with WP 0006 00, then by smashing, disassembling and scattering of parts, or by any manner that will render the M32 LHMBC useless to the enemy.

## PREPARATION FOR STORAGE OR SHIPMENT

Requirements for storage or shipment of the M32 LHMBC are listed in WP 0043 00.

## WARRANTY INFORMATION

All M32 LHMBC hardware, cables, and ancillary equipment are covered by the warranty. See WP 0058 00 for warranty information.

## NOMENCLATURE CROSS-REFERENCE LIST

### Common Name

### Official Nomenclature

M32 LHMBC or  
Type B+ (Hardware)

Lightweight Handheld Mortar Ballistic Computer (LHMBC), M32 (includes expansion pack and modem card)

Basic LHMBC or  
Type A (Hardware)

Lightweight Handheld Mortar Ballistic Computer (LHMBC) (does not include expansion pack and modem card)

Modem Card

TACLINK-3000 Modem Card

**LIST OF ABBREVIATIONS/ACRONYMS**

<b><u>Abbreviation/Acronym</u></b>	<b><u>Definition</u></b>
AAL	Additional Authorization List
AC	Alternate Current
Addr	Address
Adj	Adjust
ADJ	Adjust Fire
AEPS	Army Electronics Produce Support
AFATDS	Advanced Field Artillery Tactical Data System
AimPt	Aim Point
Alpha	Alphabetical
Alt	Altitude
AMC	At My Command
Ammo	Ammunition
Amp	Ampere
ANCD	Automated Network Control Device
AOF	Azimuth Of Fire
Approx	Approximately
AR	As Required
Arp	Address resolution protocol
Att	Attitude
Attn	Attention
AzCF	Azimuth Correction Factor
Azim	Azimuth
Bat	Battery
BII	Basic Issue Items
BIT	Built-In Test
BK	Ballistic Kernel
BOI	Basis Of Issue
BurstHt	Burst Height
C	Celsius
C	Operator/Crew maintenance level (MAC)
CAGEC	Commercial And Government Entity Code
CF	Check Fire
CFF	Call For Fire
ChkFire	Check Fire
Chrg	Charge
CHS	Common Hardware Support
COEI	Components Of End Items
Commo	Communications
CM	Collateral Material
CM	Current Met
Config	Configuration
CONT	Continuous
CPC	Corrosion Prevention and Control
D	Depot maintenance level (MAC)
D	Diameter

**LIST OF ABBREVIATIONS/ACRONYMS - Continued**

<b><u>Abbreviation/Acronym</u></b>	<b><u>Definition</u></b>
DA	Department of the Army
DC	Direct Current
Decl	Declination
Defl	Deflection
Del	Delete
Del KnPt	Delete Known Point
Desc	Description
Dest	Destination
Dev	Device
Dir	Direction
DLY	Delay
DNG CLS	Danger Close
DNL	Do Not Load
DNO	Did Not Observe
DOD	Department Of Defense
DRMO	Defense Reutilization and Marketing Office
DSN	Defense Switched Network
Dtls	Details
DTG	Date Time Group
E	Easting
ea	Each
Edc	Error detection and correction
e.g.	For example; such as
EIC	End Item Code
EIR	Equipment Improvement Recommendations
Elev	Elevation
EMP	Electromagnetic Pulse
En	Enable
EOM	End Of Mission
F	Direct Support maintenance level (MAC)
F	Fahrenheit
FDC	Fire Direction Center
FFE	Fire For Effect
FGC	Federal Group Code
Fh	Frequency hopping
Fig.	Figure
FM	Field Manual
FO	Forward Observer
FOS	Forward Observer System
FP	Firing Point
FPF	Final Protective Fire
FS	Fuze Setting
FSCM	Fire Support Coordination Measure
FSE	Fire Support Element
ft	Foot; feet

<b><u>Abbreviation/Acronym</u></b>	<b><u>Definition</u></b>
Geo Ref	Geographical Reference
GPS	Global Positioning System
Grid Decl	Grid Declination
GT	Gun Target
GTL	Gun Target Line
H	General Support maintenance Level (MAC)
H	Height
HCI	Hardness Critical Item
HE	High Explosive
HE ADJ	High Explosive Adjust
HE FFE	High Explosive Fire For Effect
Hemi	Hemisphere
HQ	Headquarters
hr(s)	Hour(s)
Hz	Hertz
IAW	In Accordance With
IL or ILL	Illumination
IL ADJ	Illumination Adjust
IL FFE	Illumination Fire For Effect
ILLUM	Illumination
IM	Immediate
IMMED	Immediate
IMP	Impact
in.	Inch(es)
IP	Internet Protocol
IR	Infrared
JTA	Joint Table of Allowances
kB	Kilobytes
KP	Known Point
KnPt	Known Point
L	Length
LatLong	Latitude Longitude
lb	Pound(s)
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LHMBC	Lightweight Handheld Mortar Ballistic Computer
LRU	Line Replaceable Unit
M	Meter
MAC	Maintenance Allocation Chart
MACK	Machine Acknowledgement
Map Mod	Map Modification
Max	Maximum
MaxOrd	Maximum Ordnance
MazRef	Mounting Azimuth and References
MB	MegaBytes
MCO	Marine Corps Order

**LIST OF ABBREVIATIONS/ACRONYMS - Continued**

<b><u>Abbreviation/Acronym</u></b>	<b><u>Definition</u></b>
MCPDS	Marine Corps Publication Distribution System
MDP	Mean Datum Plane
Meas	Measure
MET	Meteorological
MGRS	Military Grid Reference System
MHz	Megahertz
MIL	Military
Min	Minimum
min	Minute(s)
mm	Millimeter(s)
Mnt	Mount
Mnt Az	Mounting Azimuth
MOA	Method Of Adjustment
MOC	Method Of Control
MOF	Method Of Fire
MPI	Mean Point of Impact
Msg	Message
Msn	Mission
MTOE	Modified Table of Organization and Equipment
N	Northing
Nad	Net access delay
NATO	North Atlantic Treaty Organization
NAVMC	Navy Marine Corps
NBC	Nuclear, Biological, and Chemical
N/G	Not Given
NHA	Next Higher Assembly
NIIN	National Item Identification Number
NiMH	Nickel Metal Hydride
No.	Number
NSN	National Stock Number
Num	Number
NVG	Night Vision Goggles
O	Unit maintenance level (MAC)
Obs	Observer
OpAck	Operationally Acknowledge
OPNAVINST	Office of the Chief of Naval Operations Instruction
OpOut	Operationally Out
OpRdy	Operationally Ready
OpStatus	Operation Status
Ord	Ordnance
Orig	Originator
OrigDTG	Original Date Time Group
OR STA	Orientation Station
OTAzim	Observer Target Azimuth
PAM	Pamphlet





<b><u>Abbreviation/Acronym</u></b>	<b><u>Definition</u></b>
PC	Personal Computer
PCMCIA	Personal Computer Memory Card International Associate
PMCS	Preventive Maintenance Checks and Services
PN	Part Number
POC	Point Of Contact
PQDR	Product Quality Deficiency Report
PRC	Processed
Press	Pressure
Pri	Priority
Prop Temp	Propellant Temperature
Prx	Proximity
PTM	Plain Text Message
Qty	Quantity
Qty Req	Quantity Required
RAM	Random Access Memory
RcvdDTG	Received Date Time Group
Recm	Recommended
Ref	Reference
Reg	Registration
RevDTG	Received Date Time Group
RFFE	Repeat Fire For Effect
RMA	Return Material Authorization
RnCF	Range Correction Factor
Rng	Range
ROM	Read-Only Memory
RP	Red Phosphorus
RP	Registration Points
RPDA	Ruggedized Personal Digital Assistant
RP Num	Registration Point Number
RPSTL	Repair Parts and Special Tools List
RSC	Regional Support Center
SASSM	Selective Availability Anti-Spoof Module (military GPS)
SD	Secure Digital
SECNAVINST	Secretary of the Navy Instruction
Sel	Select
SF	Standard Form
SINGARS	Single-Channel Ground and Airport Radio System
SMI	Soldier Machine Interface
SMR	Source, Maintenance and Recoverability
SRA	Specialized Repair Activity
SRCH/TRAV	Search/Traverse
SSR	Supply System Responsibility
Subs Adj	Subsequent Adjust
SUPPRESS	Suppression
TAMMS	The Army Maintenance Management System
TBD	To Be Determined












**LIST OF ABBREVIATIONS/ACRONYMS - Continued**

<b><u>Abbreviation/Acronym</u></b>	<b><u>Definition</u></b>
TCIM	Tactical Communication Interface Modem
Temp	Temperature
Tgt	Target
Tgt/Knpt	Target/Known Point
TgtNum	Target Number
TM	Technical Manual
TMDE	Test, Measurement and Diagnostic Equipment
TOE	Table of Organization and Equipment
TOF	Time Of Flight
U/M	Unit of Measure
UOC	Usable On Code
URN	Unit Reference Number
USB	Universal Serial Bus
USMC	United States Marine Corps
UTM	Universal Transverse Mercator
UUR	Using Unit Responsibility
V	Volt(s)
VDB	Version Drop Build
VDC	Volts Direct Current
VI	Vertical Interval
VMF	Variable Message Format
W	Width
WE	World Geodetic System
WGS	World Geodetic System
WLAN	Wireless Local Area Network
WP	White Phosphorus
WP	Work Package
Wpn	Weapon
Wpn-Mnt	Weapon-Mount
WR	When Ready

**LIST OF LHMBC SOFTWARE MESSAGE ICONS**

<b><u>Icon</u></b>	<b><u>Definition</u></b>
	Check fire
	Error
	Exclamation
	Flash priority

<b>Icon</b>	<b>Definition</b>
	Immediate priority
	Information
	Low battery/No external power attached
	New
	Priority priority
	Processed
	Processing Wheel
	Routine priority
	Warning

## QUALITY OF MATERIAL

Material used for replacement, repair, or modification must meet the requirements of this TM. If quality of material requirements are not stated in this TM, the material must meet the requirements of the drawings, standards, specifications, or approved engineering change proposals applicable to the subject equipment.

## SAFETY, CARE, AND HANDLING

### Safety

The Lithium-sulfur dioxide (Li-SO<sub>2</sub>) battery pack BA5800 and the rechargeable BB2800 CANNOT be used to charge the LHMBC because the battery adapter may rupture causing injury to personnel due to battery out gasing.

Lithium batteries are potentially hazardous if misused or tampered with. To prevent injury to personnel or equipment damage, the batteries should not be heated, crushed, punctured, mutilated, opened, disassembled, short circuited, recharged, or used under conditions exceeding the operational condition. If heated or disposed in a fire, lithium batteries can explode.

Do not incinerate or heat batteries. Batteries could rupture.

Do not mix and use different types of batteries and/or new and used batteries. Batteries could rupture or leak.

Use ONLY the 1.5/1.8 volt AA batteries specified herein.

NEVER attempt to charge non-rechargeable batteries, such as the L91 Lithium batteries. Batteries could rupture or leak.

Use caution when changing the AA batteries if the battery adapter has been used. The AA batteries can get very HOT.

To reduce the risk of electrical shock, do not spray liquid directly on the screen or allow excess liquid to drip inside the LHMBC. Keep all ports covered, especially the SD slot.

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## **SAFETY, CARE, AND HANDLING - Continued**

### **Safety - Continued**

For battery disposal, refer to TB 43-0134.

For first aid information, refer to FM 4-25-11.

Prior to ALL lithium battery storage and disposal actions, coordinate with local environmental office/officer to ensure compliance with all federal and state regulations. See WP 0052 00 (Components of End Items and Basic Issue Items List).

Do not carry loose batteries in a pocket with metal objects. The batteries could short circuit generating high heat.

To reduce the risk of damage to the LHMBC internal components, do not spray liquid directly on the screen or allow excess liquid to drip inside the LHMBC.

Do not place anything on top of the LHMBC to prevent damage to the screen.

Do not remove or deface any stickers.

### **Care and Handling**

Use protective cover when LHMBC is not being used.

Clean the LHMBC display screen and exterior using a soft, damp cloth moistened only with water. Avoid solvents that may damage the display screen.

Avoid exposing the LHMBC to direct sunlight or strong ultraviolet light for extended periods of time.

Extensive heat and direct sunlight may cause deterioration of the LHMBC. Keep the LHMBC under shelter when possible.

All LHMBCs should be returned to the DRMO for proper disposal in accordance with local regulations due to the lithium thionyl chloride battery that is mounted on the motherboard and the mercury in the LCD display.

When shipping/storing batteries, ensure packaging preclude shorting of battery terminals to one another.

In the event of contamination, display screen of computer must be decontaminated with sorbent decontaminant or 5% bleach solution to prevent damage to equipment.

Do not use the sharp end of the stylus or any other sharp item to push on a LHMBC button or the button switch inside the LHMBC may break.

## **SUPPORTING INFORMATION FOR REPAIR PARTS, SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT**

### **Common Tools and Equipment**

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE), CTA 50-970, Expendable/Durable Items (Except: Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items, as applicable to your unit.

### **Special Tools, TMDE, and Support Equipment**

No special tools are required for operator or unit maintenance.

### **Repair Parts**

Repair parts are listed and illustrated in WP 0045 00.

**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**EQUIPMENT DESCRIPTION AND DATA**

**EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES**

The M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) is a one-for-one replacement for the M23 Mortar Ballistic Computer in the Light Infantry Force (60mm, 81mm, and 120mm Mortars). The LHMBC is a lightweight, handheld Ruggedized Personal Digital Assistant (RPDA) computer that is running fire control software. It is powered by an internal rechargeable lithium polymer battery. The internal batteries are charged by using the battery adapter with AA batteries, or by using the AC power adapter or by DC power using the DC/DC converter (see Power Management WP 0005 00).

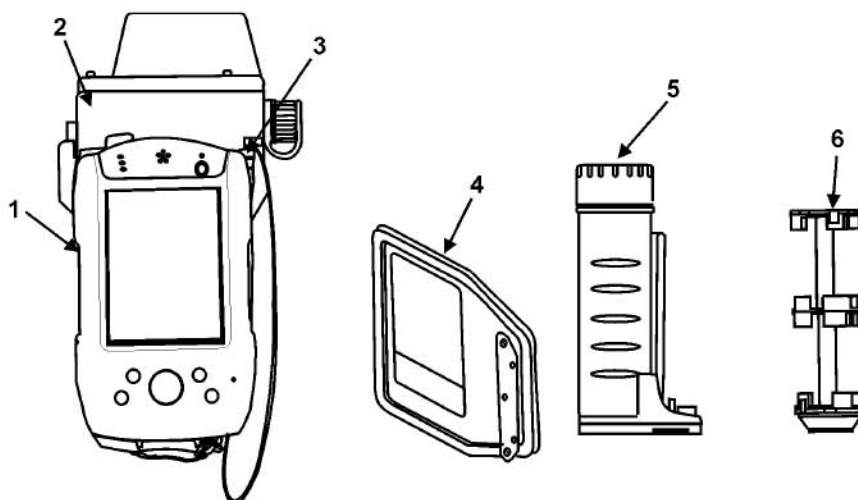
The M32 LHMBC capabilities include: ammunition inventory management; individual gun adjustment; final protective fires; search & traverse fire; precision registration; mean point of impact registration; meteorology; grid, polar, shift from known point missions; single safety fan with 10 segments; stored targets/known points; controls up to 6 simultaneous missions, 3 final protective fires and 18 guns; and security features such as password protection and ZEROIZE functions.

Two M23 DC power cables can be used with the M32 LHMBC. For more information, see TM 9-1220-246-12&P.

**LOCATION AND DESCRIPTION OF MAJOR COMPONENTS**

**NOTE**

The following describes the major components of the M32 LHMBC. The basic LHMBC does not have the expansion pack with GPS and modem card.



LHMBC (1): Handheld computer which runs the fire control software.

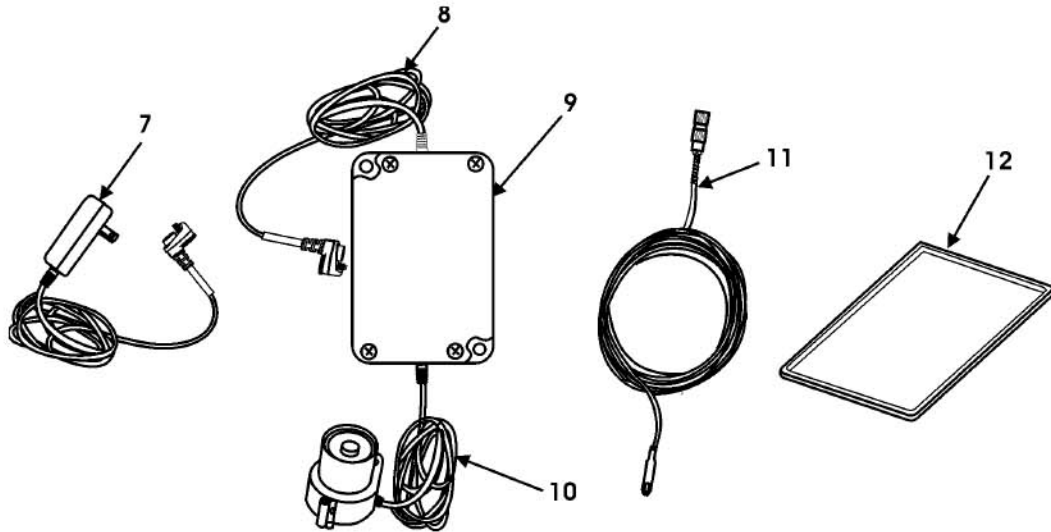
EXPANSION PACK WITH GPS AND MODEM CARD (2) (Army only): Attachment for the Basic LHMBC containing GPS circuitry and modem card.

STYLUS (3): Tool used to select functions on the LHMBC.

PROTECTIVE COVER ASSEMBLY (4): Protects the LHMBC screen display while providing the ability to view data on the screen.

BATTERY ADAPTER (5): Uses a battery holder with AA batteries to recharge the LHMBC internal batteries. Attaches to the side of the LHMBC.

BATTERY HOLDER (6): Holds ten AA batteries inside the battery adapter. (An eight AA battery holder can also be used.)

**LOCATION AND DESCRIPTION OF MAJOR COMPONENTS - Continued**

AC POWER ADAPTER (7): Provides electrical power to recharge the LHMBC internal batteries.

DC/DC RPDA POWER CABLE (8); RPDA DC/DC CONVERTER (9); NATO DC/DC CONVERTER CABLE (10): DC power components that when connected together use vehicle NATO power to recharge the LHMBC internal batteries.

RADIO CABLE (11): Provides communication connection between the LHMBC and a radio.

FILTER (12): Prevents light detection for use with night vision goggles.

**EQUIPMENT DATA****LHMBC:****Dimensions (Computer):**

Width .....	3.25 in.
Length.....	6.25 in.
Thickness.....	0.75 in.
Touch sensitive transfective LCD .....	3.77 in. diagonal w/16 bit colors and 240 x 320 resolution

**Dimensions (Computer w/GPS Dome Assembly, Expansion Pack and Protective Cover):**

Width .....	4 in.
Length.....	8 in.
Height .....	2 in.

**Weight:**

W/O external battery adapter or cables .....	1.9 lb
W/external battery adapter .....	2.6 lb
W/external battery adapter and cables.....	3.4 lb

**Power:**

Requirements.....	6 volts
Power management options.....	Internal or external
Internal batteries .....	Lithium polymer
Recharge options .....	Battery adapter; AC power adapter; NATO cable kit; radio power cable; battery power cable

## Operational Characteristics:

One internal industry standard interface

port..... RS-232C

Processor ..... 400 MHz

Random Access Memory (RAM)..... 64 MB

Read-Only Memory (ROM)..... 48 MB

Operating system..... Pocket PC 2003

Mobility..... Handheld/pocket

## AC Adapter:

Dimensions (including prongs)..... 3 in. H x 1.9 in. W x 1.8 in. D (76 x 48 x 44 mm)

Cord length..... Approx 6 ft (1.83 m)

## Power Supply Ratings:

Voltage range ..... 100 to 240 V Switching

Input current ..... 0.3 A

Input frequency..... 50 to 60 Hz

Output voltage ..... 5 VDC

Output current..... 2 Amp

## Environmental Characteristics:

Altitude ..... Operational 15,000 ft; storage 40,000 ft

## Temperature:

Operational ..... -25 to +131°F (-32 to +55°C)

Storage ..... -31 to +149°F (-35 to +65°C)

Humidity ..... 95% non-condensing; 10 24-hr cycles

Salt fog ..... 48 hrs of exposure

Immersion ..... 1 m of water

Vibration ..... Secured cargo

Transit drop ..... 48 in. drop height

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**THEORY OF OPERATION**

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## **GENERAL**

The M32 Lightweight Handheld Mortar Ballistic Computer (LHMBC) is a one-for-one replacement for the M23 Mortar Ballistic Computer in the Light Infantry Force (60mm, 81mm, and 120mm Mortars). The M32 LHMBC provides the operator with an automated fire control system that will provide improvements in the command and control functions of mortar firing operations. It has the capability of calculating all fire control information required to fire the 60mm, 81mm, and 120mm mortars to include all full and sub-caliber training ammunition.

The M32 LHMBC enhances the speed and accuracy for targeting of supporting indirect mortar fires. It provides the essential functions of mortar fire control; computation of ballistic solutions using MET; provides solutions for registration, immediate smoke, illumination (range spread, lateral spread), and traversing fire suppression missions. The M32 LHMBC provides fire mission data with actual gun azimuth/deflection and elevation solutions.

The M32 LHMBC consists of a Ruggedized Personal Digital Assistant (RPDA) with an expansion pack attached. The expansion pack provides Global Positioning System (GPS) capability and communication capability via radio or wire. The LHMBC will communicate with Field Artillery/Fire Support Type Devices, i.e., AFATDS 6.3 VMF R2 (Package 11) and FOS with versions 12 and 7. Thus the LHMBC will process digitally received or manually entered calls for fire and provides ballistic solutions throughout the full range of operations.

**CHAPTER 2**

**OPERATOR INSTRUCTIONS**

**FOR**

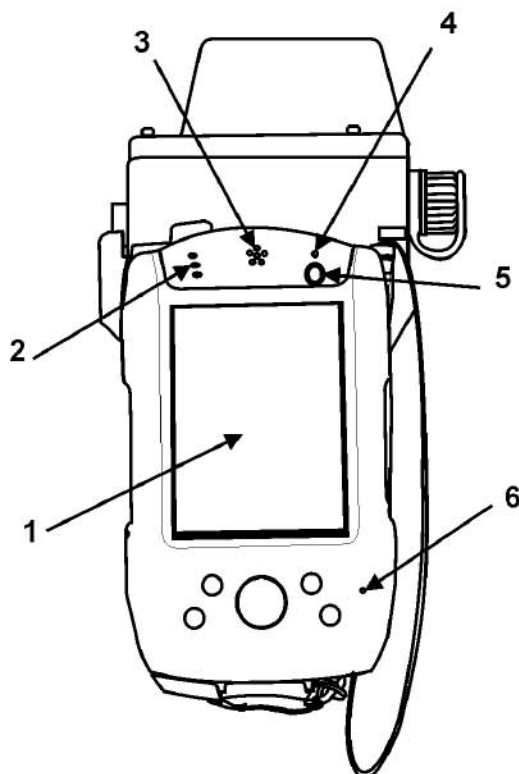
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**



**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
 (NSN 7021-01-521-1611, PN 13007892)  
**DESCRIPTION AND USE OF CONTROLS AND INDICATORS**

**M32 LHMBC**

Table 1 describes controls and indicators on the front of the M32 LHMBC.



**Table 1. Front of M32 LHMBC .**

KEY	CONTROL OR INDICATOR	FUNCTION
1	Display Screen	Displays menus and screens.
2	LED Lights*	
3	Speaker	Sounds alarm.
4	Power Indicator	Displays power mode (flashing = charging; solid = charged; off = no external power).
5	Sleep Button (Power Button)	Puts computer in Sleep Mode (toggles backlight ON or OFF).
6	Microphone*	

\* Not used for M32 LHMBC.

## M32 LHMBC - Continued

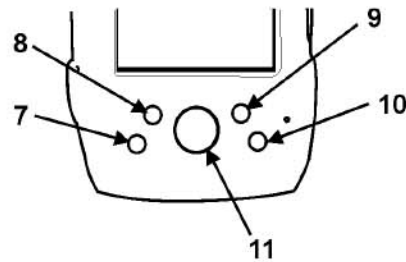


Table 1. Front of M32 LHMBC - Continued.

KEY	CONTROL OR INDICATOR	FUNCTION
	LHMBC Shortcut Buttons:	
7	Manual Missions Button	A menu with mission types is displayed. Clicking on a mission displays that manual mission screen.
8	Mission Solution Button	<ul style="list-style-type: none"> <li>- No active mission, nothing happens.</li> <li>- One active mission, Solution/Gun Orders screen is displayed.</li> <li>- Multiple active missions (within a mission), Solution/Gun Orders screen is displayed. If not in Mission screen pop-up Menu List, all active missions are displayed.</li> </ul>
9	Mission Gun Select Button	<ul style="list-style-type: none"> <li>- No active mission, nothing happens.</li> <li>- One active mission, Gun Select screen is displayed.</li> <li>- Multiple active missions (within a mission), Gun Select screen is displayed. If not in Mission screen pop-up Menu List, all active missions are displayed.</li> </ul>
10	Mission Subsequent Adjust Button	<ul style="list-style-type: none"> <li>- No active mission, nothing happens.</li> <li>- One active mission, Subsequent Adjust screen is displayed.</li> <li>- Multiple active missions (within a mission), Subsequent Adjust screen is displayed. If not in Mission screen pop-up Menu List, all active missions are displayed.</li> </ul>
11	Call For Fire (CFF) Button	If Commo is enabled, CFF screen is displayed. Otherwise nothing happens when button is pressed.

Table 2 describes controls and indicators on the top of the M32 LHMBC.

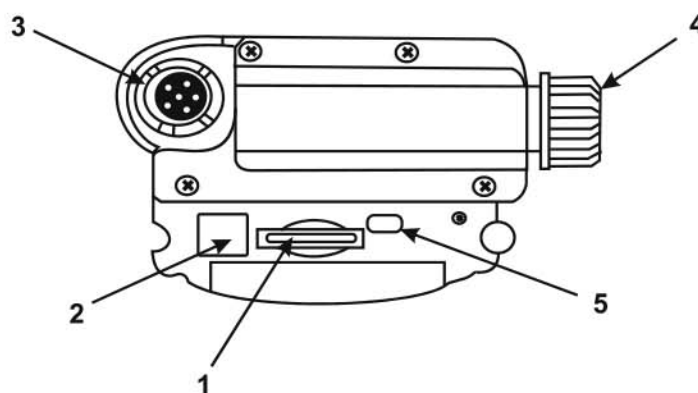


Table 2. Top of M32 LHMBC.

KEY	CONTROL OR INDICATOR	FUNCTION
1	Secure Digital (SD) Slot	Holds SD memory card.
2	Wireless Antenna*	
3	GPS Fill Connector	Uses ANSD to fill Comsec into GPS.
4	Communications Connector	Connects LHMBC radio cable to communications devices.
5	Infrared Communication Lens*	

\* Not used for M32 LHMBC.

Table 3 describes controls and indicators on the bottom of the M32 LHMBC.

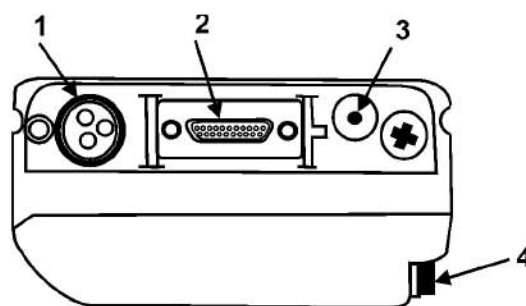


Table 3. Bottom of M32 LHMBC.

KEY	CONTROL OR INDICATOR	FUNCTION
1	External Power Connector	Used to charge internal batteries through use of external sources.
2	Serial Port*	
3	Soft Reset Button	Used to reset settings (use stylus to reset).
4	External GPS Antenna Connector	Connector (located on expansion pack) available for use with external GPS antenna.

\* Not used for M32 LHMBC.

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**POWER MANAGEMENT**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:****References**WP 0040 00

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**GENERAL**

This WP provides information on the LHMBC internal batteries, checking the power status of the internal batteries, the operating system battery warnings, charging the batteries, and external power sources. This information will help to manage the power available to the LHMBC.

**CAUTION**

The computer will not operate, even if external power is present, if the main internal battery is substantially depleted. To ensure the LHMBC is operational and ready to use, it is imperative external power always be applied. If AC or vehicle DC power is not available, connect the battery adapter with AA batteries.

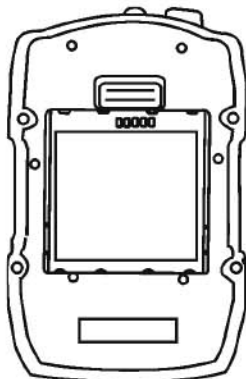
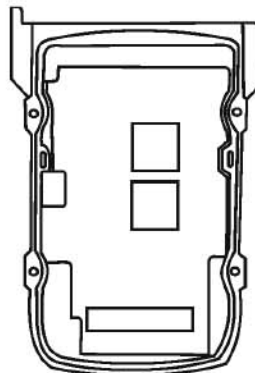
**BATTERY DESCRIPTION**

The basic computer contains two internal batteries:

**Main Internal Battery.** This is a Lithium Ion battery and is field replaceable. This battery powers the basic computer, and maintains LHMBC software and data in RAM when in Sleep or Standby mode. When the charge is depleted ( $< 3.2$  V), the main internal battery will enter a dormant state. In the dormant state, the basic computer will not operate.

**Backup Battery (not shown).** This is a Lithium Ion battery that maintains LHMBC software and data for short periods of time while the main internal battery is being replaced. The backup battery will not run the LHMBC and is NOT field replaceable.

The expansion pack contains one battery, referred to as the extended battery. This is a Lithium Ion battery that powers the modem card (TACLINK) and the GPS card that are in the expansion pack. The expansion pack extended battery will not operate the basic computer and is NOT field replaceable. The LHMBC can be run in a degraded mode (without Commo and GPS) when the extended battery is low.

**BASIC COMPUTER****EXPANSION PACK**

## CHARGING LHMBC BATTERIES

### NOTE

External power does not operate the LHMBC. It only charges the internal batteries.

Connecting external power to the LHMBC will charge all three internal batteries. When external power is connected and the internal batteries are charging, the power indicator LED flashes. When the main internal battery is fully charged the LED will stop flashing and remain lit. When no external power is present, the LED is not lit. The Status screen in the LHMBC software will also show if external power is present. See WP 0040 00 for procedures to charge the LHMBC batteries.

External power sources:

- DC vehicle power using the DC adapter and DC power cables (NATO, vehicle battery, or radio mount).
- AC power using the AC power adapter.
- Battery adapter and holder with AA Batteries.

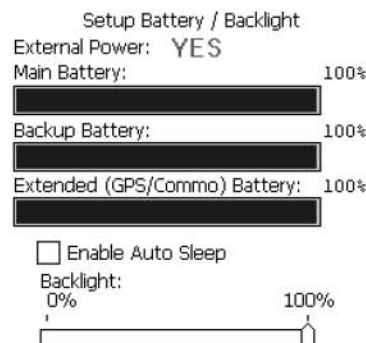
## BATTERY POWER LEVEL STATUS

The power levels of the three LHMBC internal batteries are displayed in both the LHMBC software and the operating system.

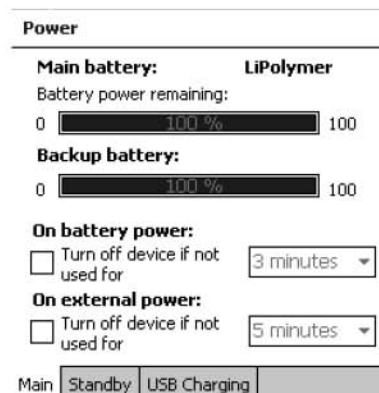
The LHMBC software displays the status of the main internal and backup batteries in the basic computer and the extended battery in the expansion pack (if present). The Setup Battery/Backlight screen is displayed by clicking **Menu/Setup/Bat/Backlight**. This screen also provides the status of external power (either YES or NO).

### NOTE

If the battery adapter determines the LHMBC is sufficiently charged, it will periodically cycle off to conserve AA batteries. When this occurs, the LHMBC indicates that no external power is present. To verify the AA batteries are properly charged, remove and re-insert battery holder.



The status of the main internal and backup batteries in the basic computer can be checked from the operating system by clicking **Start/Settings/System** tab/**Power** icon to display the Power screen. Both of these batteries are located in the basic computer.



The status of the expansion pack extended battery can be checked from the operating system by clicking **Start/Settings/System** tab/**Expansion Pack** icon to display the Expansion Pack Information screen. (Note that the external battery referred to on the screen is the extended battery in the expansion pack.)

#### Expansion Pack Information

##### External Battery:

Yes

##### Description:

GPS Expansion Pack

##### External battery: LiPolymer

Battery power remaining:

0  100%

☐ Disable Insertion Sound

[Diagnostic](#)

## POWER MODES

### Operating Mode

Operating Mode means the LHMBC is fully functional.

Below are projections of battery life timelines that can be expected based on continuous operation. Actual battery life may be much longer if use is not continuous. Times are average. Actual battery life may vary. Times are based on fully charged internal batteries and new AA batteries at starting time.

#### M32 LHMBC - Operating

AA Power	GPS OFF	COMMO OFF	AA=15 hrs	Main=10 hrs Extended=8 hrs	Standby 12/72 hrs	Dormant
AA Power	GPS ON	COMMO OFF	AA=10 hrs	Main=8 hrs Extended=7 hrs	Standby 12/72 hrs	Dormant
AA Power	GPS OFF	COMMO ON	AA=8 hrs	Main=8 hrs Extended=6 hrs	Standby 12/72 hrs	Dormant
AC or DC Power Cable			Always Has Power			

#### Basic LHMBC - Operating

AA Power				
	AA=15 hrs	Main=5 hrs	Standby 12/72 hrs	Dormant
AC or DC Power Cable	Always Has Power			

## NOTE

Battery life is reduced at low temperatures.

When the power in the expansion pack extended battery is low, the GPS and the TACLINK modem functions will be lost. The LHMBC can be operated in a degraded mode (without Commo and GPS) when the extended battery is low.

## POWER MODES - Continued

### Sleep Mode

Sleep Mode is the power saving mode. The LHMBC can be put to sleep manually by pressing the Sleep button or by using Auto Sleep. To conserve battery power, the system should be put in Sleep Mode whenever possible.

Digital messages cannot be received while in Sleep Mode. Auto Sleep should not be enabled if expecting digital messages.

The system can be woken-up by pressing the Sleep button. The LHMBC will resume operation where it left off. Commo and GPS functions will resume, but any missed radio messages are NOT recovered. If Commo and GPS were enabled before Sleep Mode, it will take longer to resume operations while the Commo and GPS initialize (approx 90 sec).

### NOTE

Internal batteries continue to discharge at a reduced rate while in Sleep Mode.

Below are projections of how long the system can remain in Sleep Mode (prior to software/data being lost and/or the main internal battery entering the dormant state) based on the initial battery conditions shown. Times are average. Actual battery life may vary. Times are based on fully charged internal batteries and new AA batteries at starting time.

#### M32 LHMBC and Basic LHMBC - Sleep Mode

No External Power	Sleep=10 days	Standby 12/72 hrs	Dormant
AA Power	Sleep=30 days		Standby 12/72 hrs
AC or DC Power Cable	Always Has Power		
			Dormant

### NOTE

Battery life is reduced at low temperatures.

The LHMBC can be put to sleep manually by pressing the Sleep button or by using the Auto Sleep function. To conserve battery power, the system should be put in Sleep Mode whenever possible.

### NOTE

Digital messages cannot be received while in Sleep Mode.

Setting Idle Time Within Operating System:

1. Click **Start/Settings/System** tab/**Power** icon to display the Power screen.
2. Check both boxes for **On battery power** and **On external power**. Set idle time settings as desired. (Note that **On battery power** applies only when no external power is present. **On external power** includes AC, vehicle DC, and AA battery power.)

Setting Auto Sleep Within LHMBC Software:

1. Click **Menu/Setup/ Bat/Backlight** to display the Setup Battery/Backlight screen.
2. Check **Enable Auto Sleep** to enable the operating system Auto Sleep settings.

### NOTE

If Commo and/or GPS is enabled at startup, the Auto Sleep is not available.

## Standby Mode

### NOTE

Keep external power applied at all times to avoid entering Standby Mode.

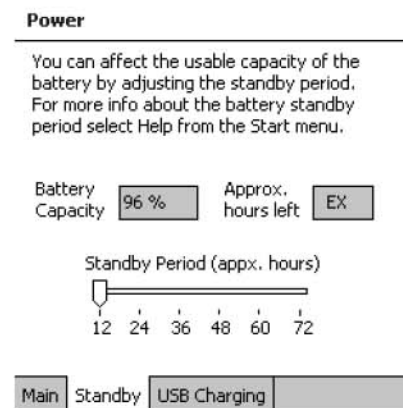
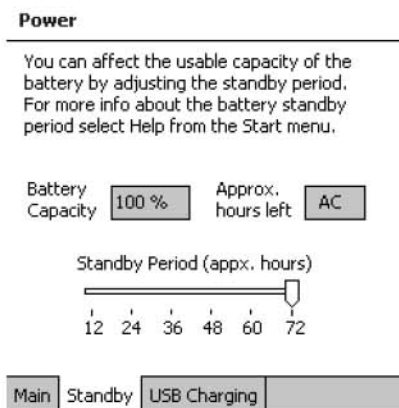
The system automatically enters Standby Mode when the main internal battery is almost depleted and there is insufficient power to operate. In this mode, the main internal battery power is used solely to maintain system software and data in memory.

To bring the computer out of Standby Mode, apply external power and perform a soft reset (see WP 0040 00). Previously saved data will not be lost.

If the system remains in the Standby Mode for a period of time (12 to 72 hr), the main internal battery will eventually drop below 3.2V and the system will enter the Dormant Mode.

The length of time that the system can remain in Standby Mode before entering the Dormant Mode can be adjusted from the operating system. The amount of Standby Mode (Standby Period) can be adjusted from 12 to 72 hours. The default setting is 72 hours. This setting should only be adjusted as a last resort if no external power is available.

The Standby Period can be adjusted from the operating system by clicking **Start/Settings/System tab/Power icon/Standby** tab. If no external power is present, this screen displays the estimated hours left until automatic power-off (time is dependant on Standby Period). This is the estimated amount of time the system will retain data after it has been discharged.



## Dormant Mode

### NOTE

Keep external power applied at all times to avoid entering Dormant Mode.

After the system has been in the Standby Mode for a period of time (approximately 12 to 72 hr), the main internal battery will eventually drop below 3.2V and the battery enters the Dormant Mode.

The system will not operate if the main internal battery is in the Dormant Mode (even if external power is present). Installed LHMBC software and current data will be lost.

Once the main internal battery enters the Dormant Mode (<3.2V), the battery recharges very slowly and may take up to six days depending on the severity of battery depletion. When the main internal battery voltage reaches 3.2V, the system can be operated again.

### NOTE

The LED charging indicator will not blink during the slow charging phase.



## POWER MODES - Continued

### Dormant Mode - Continued

A spare main internal battery is provided with each system so that if the computer's main internal battery has gone dormant, the LHMBC can be quickly made operational again (see WP 0040 00).

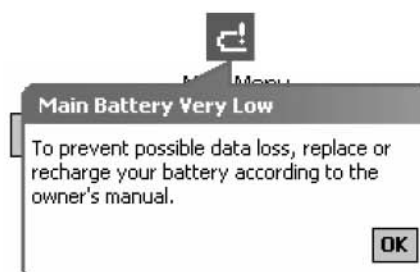
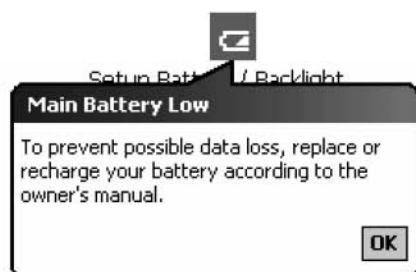
When the main internal battery has been sufficiently charged (or replaced), the LHMBC software must be re-installed from the file store (see WP 0040 00). A backup database can be restored from the LHMBC Maintenance Application if previously backed up before Standby Mode (see WP 0040 00).

## OPERATING SYSTEM BATTERY MESSAGES

### Main Internal Battery

**Main Battery Low.** An icon is displayed in the task bar and a warning popup window is displayed when the main internal battery level is low. This is an important indication that the user must apply external power.

**Main Battery Very Low.** A second warning popup window is displayed when the system is about to enter Standby Mode (the system will not operate). The user must apply external power to avoid automatic Standby Mode.



### Extended Battery

#### NOTE

Keep the external power applied at all times to avoid the loss of Commo and/or GPS capability.

**Extended Battery Very Low.** This message is displayed when the expansion pack battery is very low. Commo and GPS functions may not work properly until the expansion pack battery is recharged.

**Extended Battery Fault.** This message is displayed when the expansion pack battery is dead. Commo and GPS will not work until the expansion pack battery is recharged.

#### NOTE

If the expansion pack battery is dead when the LHMBC software is started, the **Commo** and **GPS** buttons are not displayed.



## RECOMMENDED USE

Always maintain external power to the LHMBC to avoid draining the internal batteries and possible loss of capabilities and data. Use AC or DC converters if possible to minimize battery usage. Periodically charge the provided spared main internal batteries.

## POWER CONSERVATION

The LHMBC power can be conserved by:

- Selecting the correct operating configuration when the LHMBC software is started (the Commo and/or GPS can be disabled to conserve power).

- Putting the system to sleep if not being used (manual or Auto Sleep).

- Reducing backlight if not needed.

## BACKLIGHT SETTINGS

Adjusting the backlight setting will conserve power, improve visibility, and reduce detectability.

### Turning Backlight ON/OFF

Pressing and holding the Sleep button for approximately 3 seconds will toggle the backlight ON or OFF.

### Setting Backlight Within LHMBC Software

Click **Menu/Setup/ Bat/Backlight** to display the Setup Battery/Backlight screen. Adjust backlight slider as desired.

## STORAGE

For extended periods of inactivity the LHMBC main internal battery must be put into Storage configuration (see WP 0040 00). This will result in minimal battery discharge over long periods of time.

All spare and stored batteries should be checked periodically and charged if needed.

Below are projections of how long the system can remain in Storage based on the initial battery conditions shown. Times are average. Actual battery life may vary. Times are based on fully charged internal batteries and new AA batteries at starting time.

### M32 LHMBC and Basic LHMBC - Storage

Main Battery Physically or Electrically Disconnected	Storage=6 months	Recharge
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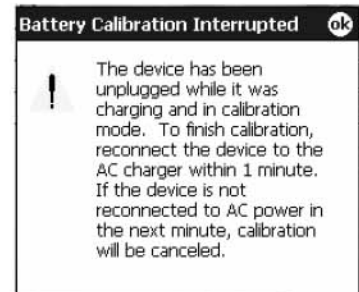
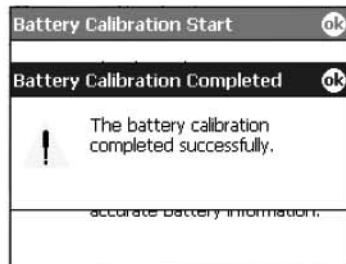
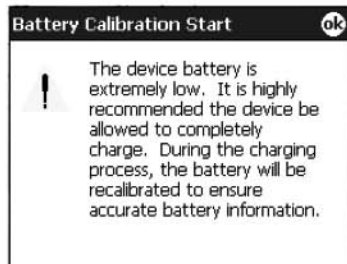
## NOTE

Removing the main internal battery will cause a loss of installed LHMBC software and current data. The LHMBC software must be re-installed from the file store (see WP 0040 00). A backup database can be restored from the LHMBC Maintenance Application if previously backed up (see WP 0040 00).

## BATTERY CALIBRATION MESSAGES

The main internal battery requires calibration to report accurate power levels and provide battery protection. The operating system will automatically calibrate the battery when necessary. The user does not need to perform a calibration nor is any action required when the system is being calibrated.

The following battery calibration messages may be displayed.



END OF WORK PACKAGE

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**LHMBC SOFTWARE OVERVIEW**

---

**INITIAL SETUP:****References**

WP 0001 00  
WP 0010 00  
WP 0020 00

**References - Continued**

WP 0040 00  
WP 0057 00

---

**GENERAL**

This work package provides an overview of the LHMBC software. Included is information on the password, LHMBC software messages, the Menu function, the data displayed on the screens, viewing data details, entering data, entering positions, and Zeroizing the LHMBC.

**PASSWORD**

Pointsec is the password software used on the LHMBC. A password is required every time you come out of Sleep Mode. When a password is required, the following screen is displayed. A password must be at least 6 numeric characters and 3 successive characters cannot be the same. The default password is 112233. Once a password is set it never expires. There is no limit to the amount of times you can attempt to enter a password. When typing the password, the numbers are scrambled on the screen. To change or reset a password, see WP 0040 00.

**LHMBC SOFTWARE MESSAGES****Warning Messages**

A relevant warning message is displayed in response to the following events and conditions:

- An unsafe condition
- Potential loss of data
- System degradation.

Warning messages signify a safety violation. An audio alert may sound. Immediate operator attention to a warning message is required.

## LHMBC SOFTWARE MESSAGES - Continued

### Error Messages

A relevant error message is displayed in response to the following events and conditions:

- Incorrect keypad entry of entered data
- Incorrect data combination
- Incorrect data duplications
- Failure of ballistic computations
- Hardware and software failures.

Error messages inform the operator of the specific error and provides information to correct the error. An audio alert will sound. Error messages must be cleared before the operator can continue.

### NOTE

A complete listing of error and warning messages with possible causes and corrective actions is located in WP 0057 00.

### Information Messages

Information messages are displayed as necessary to let the operator know general types of information, e.g., “Data that has not been saved will be discarded. Would you like to change your view?” or “A new modem is detected.” No audio alert will sound.

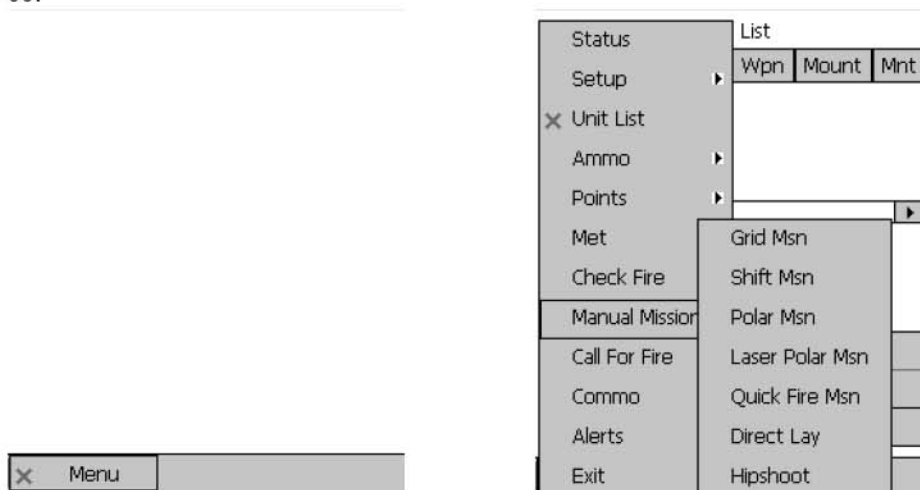
### Alerts

The Alerts function contains an information log of operational state changes. See WP 0020 00.

### MENU

A **Menu** control button is available at the bottom left on most of the screens. When clicked, it displays a Menu List showing the functions available in the LHMBC software. Clicking an arrow beside a function displays a sublist of functions (e.g., **Manual Missions** has a sublist of all the mission options). Some of the functions will not be displayed/available if using the M32 LHMBC with the GPS and/or Commo turned off or if using the Basic LHMBC.

A message icon displayed on **Menu** means something needs attention (e.g., a red “X” on **Unit List** indicates required data is missing) or a message has been received (e.g., a green “R” on **Commo/PTM/Read** indicates a routine message has been received). The icon for the highest priority message is displayed next to **Menu**. When a message is received, the audio alarm will sound if the alarm was set to on. The Menu List shows the function affected. A complete listing of message icons is located in WP 0001 00.



## SCREENS

### NOTE

Some of the screens throughout the TM will differ depending if the M32 LHMBC is being used with the GPS and/or Commo turned on or off or if the Basic LHMBC is being used.

Action buttons (1) are used to add, edit, clear, delete, view, or acknowledge data. If an action button is grey, the function is not enabled. Selecting a data line or entering the required data enables the button.

Scroll bars (2) can be used to view data that does not fit on the screen.

Data lines (3) display data particular to the screen. The columns can be adjusted by using the stylus to increase or decrease the size of the column.

The title of the screen (4) is displayed at the top center of each screen.

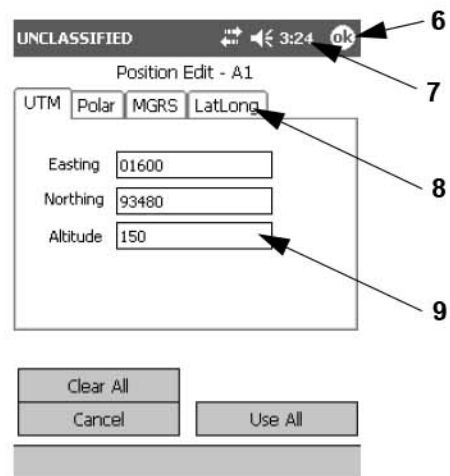
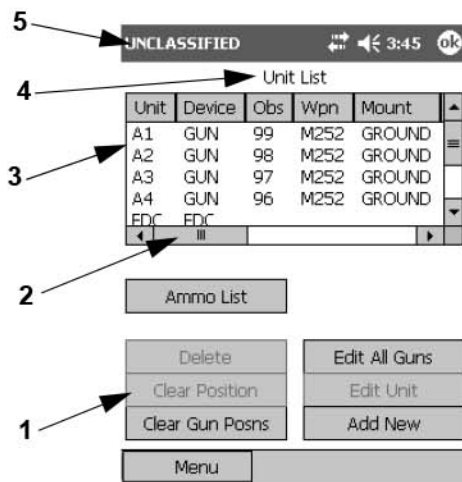
The classification (5) is displayed in the top left corner.

An “X” or “ok” (6) is displayed on the top right corner but has no function in the LHMBC software. In most pocket PC applications, clicking the “X” or “ok” closes the screen.

The time (7) is displayed in the upper right corner of the screen.

Tabs (8) are used to switch screens within a screen.

Data is added or edited using entry boxes (9).



## DETAILS

All the details for particular data can be displayed on the screen (rather than using the scroll bar). Use the stylus to press on a data line and the details for that data are displayed at the bottom of the screen. Lifting up on the stylus displays the action buttons.

The details can be displayed on the screen without having to keep the stylus pressed on the data line. Use the stylus to press on a data line, drag the stylus to the bottom of the screen, and lift up on the stylus. The details remain on the screen. Clicking anywhere in the data box displays the action buttons.

Unit List

Unit	Device	Obs	Wpn	Mount	
A1	GUN	99	M252	GROUND	▲
A2	GUN	98	M252	GROUND	≡
A3	GUN	97	M252	GROUND	
A4	GUN	96	M252	GROUND	▼
FDC	FDC				

Device GUN Unit Name A1

Obs Num 99

Weapon Type M252-GROUND

Mnt 2760 Ref 2800 Prop 70

Az Tmp

**Position**

01600	93450	0150	16	NORTH
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## ENTERING DATA

### NOTE

When there is an active mission, some data cannot be edited or deleted (e.g., no changes can be made to the guns in the active mission).

An alphabetical/numerical keyboard (1) is displayed if the data can be letters and/or numbers. A numerical keyboard (2) is displayed if the data requires numbers only.

Unit List Add/Edit

Device  Unit Name

Obs Num

Unit List Add/Edit

Device  Unit Name

Obs Num

Position

Edit GPS

1	2	3	4	5	6	7	8	9	0	-	+	←
→	Q	W	E	R	T	Y	U	I	O	P		
	A	S	D	F	G	H	J	K	L			
	Z	X	C	V	B	N	M	.				

1

Position

Edit GPS

1	2	3	←	
4	5	6	.	-
7	8	9	0	TAB

2

### NOTE

To remove a keyboard from the screen, click on the screen above the keyboard.

An arrow (3) next to an entry box indicates there is a selection list (4) to choose from.

Some data is entered by clicking a check or dot in a button (5).

Data that is grey (6) is read-only and cannot be changed.

The left screenshot shows a 'Unit List' screen. At the top, there is a 'Unit List Add/Edit' button. Below it, there is a 'Device' dropdown menu with 'FDC' selected. To the right of the dropdown is a 'Unit Name' text box. Below the 'Device' dropdown is a '<Select>' button. Below that is a list of options: 'FDC', 'FO', 'FSE', 'GUN', 'OR STA', and 'OTHER'. Below this list is a 'Position' section with an 'Edit' button and a 'GPS' button. An arrow labeled '3' points to the 'Unit List Add/Edit' button. An arrow labeled '4' points to the 'Edit' button in the 'Position' section.

The right screenshot shows a 'Setup Geographical Reference' screen. At the top, there is a title 'Setup Geographical Reference'. Below it, there is a 'Ellipsoid' dropdown menu with 'WGS 1984' selected. Below that is a 'Datum' dropdown menu with 'WGS - WORLD GEODETIC' selected. Below these are two sections: 'Minimum' and 'Maximum'. Each section has four input fields: 'Easting', 'Northing', 'Zone', and 'Hemi'. In the 'Minimum' section, the values are '520000', '3823000', '14', and 'North' (selected). In the 'Maximum' section, the values are '619999', '3922999', '14', and 'North' (selected). An arrow labeled '5' points to the 'Hemi' radio button in the 'Maximum' section. An arrow labeled '6' points to the 'Easting' field in the 'Maximum' section.

## ENTERING POSITIONS

Unit positions are added or edited on the Position screen located from **Unit List** (see WP 0010 00). The tabs on the Position Edit screen are the different methods of entering a position.

### Universal Transverse Mercator (UTM)

The default is **UTM** in which the position is defined as 10 digits based on the map mod.

The screenshot shows the 'Position Edit - A1' screen. At the top, there are four tabs: 'UTM', 'Polar', 'MGRS', and 'LatLong'. The 'UTM' tab is selected. Below the tabs, there are three input fields: 'Easting' with the value '01600', 'Northing' with the value '93450', and 'Altitude' with the value '150'.

- The **Easting** must be 5 digits.
- The **Northing** must be 5 digits.
- The **Altitude** must be within the range of -400 to 9999.



## ENTERING POSITIONS - Continued

### Polar

**Polar** defines a position based on another position's reference (e.g., A2's position is 20 meters away from A1 at 300 mils azimuth).

The form is titled "Position Edit" and has four tabs: UTM, Polar, MGRS, and LatLong. The "Polar" tab is selected. Below the tabs is a "Unit" dropdown menu with the text "<Select a Unit>". Below that are three input fields: "Direction", "Distance", and "VI". To the right of "Direction" is a "Mils" label. To the right of "Distance" is a "Meters" label. To the right of "VI" are two radio buttons labeled "Up" and "Down".

- A **Unit** must be selected.
- The **Direction** and **Distance** must be entered. The **VI** (Vertical Interval) is optional.

### Military Grid Reference System (MGRS)

**MGRS** is a military specific means of entering a position.

The form is titled "Position Edit - A1" and has four tabs: UTM, Polar, MGRS, and LatLong. The "MGRS" tab is selected. Below the tabs are four input fields: "Zone", "Square", "Coordinates", and "Altitude".

- Zone.** In non-polar areas, the zone designation consists of the two-digit UTM zone number (1-60), with any leading zero included, and followed by a zone letter that identifies a band of geodetic latitude. Beginning at 80° south and proceeding northward, the 20 latitude bands are lettered C through X, omitting I and O. The bands are all 8° high except band X (72° N to 84° N), which is 12° high.

In polar areas, the zone designation consists of a single letter, as follows:

A in the Southern and Western Hemispheres,  
 B in the Southern and Eastern Hemispheres,  
 Y in the Northern and Western Hemispheres, and  
 Z in the Northern and Eastern Hemispheres.

- Square.** The 100,000-meter grid square designator consists of a pair of letters. The letters that identify a particular 100,000-meter square depend on the ellipsoid, zone, and location within the zone.

- c. **Coordinates.** The remainder of the MGRS coordinate string consists of the numeric Easting and Northing values within the 100,000-meter grid square. The left half of the digit sequence is the Easting value, which is read to the right from the left edge of the 100,000-meter grid square. The right half of the digit sequence is the Northing value, which is read northward from the bottom edge of the 100,000-meter grid square. (This means that the coordinates need to have an even number of digits.) Both the Easting and Northing values are within the range from 0 to 100,000 meters. Both Easting and Northing values must have the same resolution and must include leading zeros.
- d. **Altitude.** The altitude must be within the range of -400 to 9999.

### Latitude/Longitude (Geodetic Coordinates)

**LatLong** defines the position based on the latitude and longitude.

Position Edit - A1

UTM Polar MGRS **LatLong**

Latitude ° ' "

☒ North ☐ South

Longitude ° ' "

☒ East ☐ West

Altitude

Currently, soldiers that would be typically operating an LHMBC are trained on Geodetic coordinates in the degrees, minutes, seconds (DMS) format with a hemisphere indicator. Each latitudinal or longitudinal circle on the earth is divided into 360 degrees (°). Each degree is divided into 60 minutes ('). Each minute is divided into 60 seconds ("). Lines of latitude north of the equator are indicated by the letter N and lines of latitude south of the equator are indicated by the letter S. Lines of longitude east of the prime meridian are indicated by the letter E and lines of longitude west of the prime meridian are indicated by the letter W. A typical line of latitude in DMS format would look like 42° 12'9"N. The altitude must be within the range of -400 to 9999.

### ZEROIZING LHMBC

#### NOTE

To Zeroize the GPS fill keys ONLY, use the LHMBC Maintenance Application (see WP 0040 00).

The Zeroize application will:

- Zeroize any GPS fill keys (if applicable)
- Securely wipe and delete all user data
- Securely wipe and delete the LHMBC installation program from the File Store
- Perform a hard reset.

Once a Zeroize is performed, there will be no trace of LHMBC data. To resume LHMBC operations, the LHMBC software must be re-installed using an SD card loaded with the LHMBC installation software. This procedure is performed at the unit maintenance level.

To Zeroize the LHMBC, click **Start/Programs/Zeroize** icon.

### END OF WORK PACKAGE

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**STARTING LHMBC SOFTWARE**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:**

**References**

WP 0006 00  
WP 0008 00  
WP 0009 00  
WP 0010 00  
WP 0011 00  
WP 0012 00

**References - Continued**

WP 0013 00  
WP 0014 00  
WP 0015 00  
WP 0016 00  
WP 0040 00

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**STARTING LHMBC SOFTWARE**

**NOTE**

It is recommended to avoid running other applications when using the LHMBC software. Degradation of software performance may occur.

1. Turn on the LHMBC. The Password screen is displayed.
2. Type in the password (the default password is **112233**), then click **OK**. (See WP 0006 00 for information about the password or WP 0040 00 to change a password).
3. To start the LHMBC software, click **Start** at the top left of the operating system, then click **LHMBC** from the list.
4. Read the DOD Security Message, then click **Use All**.
5. The following flowcharts show the steps needed to set up the M32 LHMBC (fig. 1) or the Basic LHMBC (fig. 2) before performing a mission. WP references on the flowcharts refer to the WP containing the detailed information on a particular function in the LHMBC software.

## STARTING LHMBC SOFTWARE - Continued

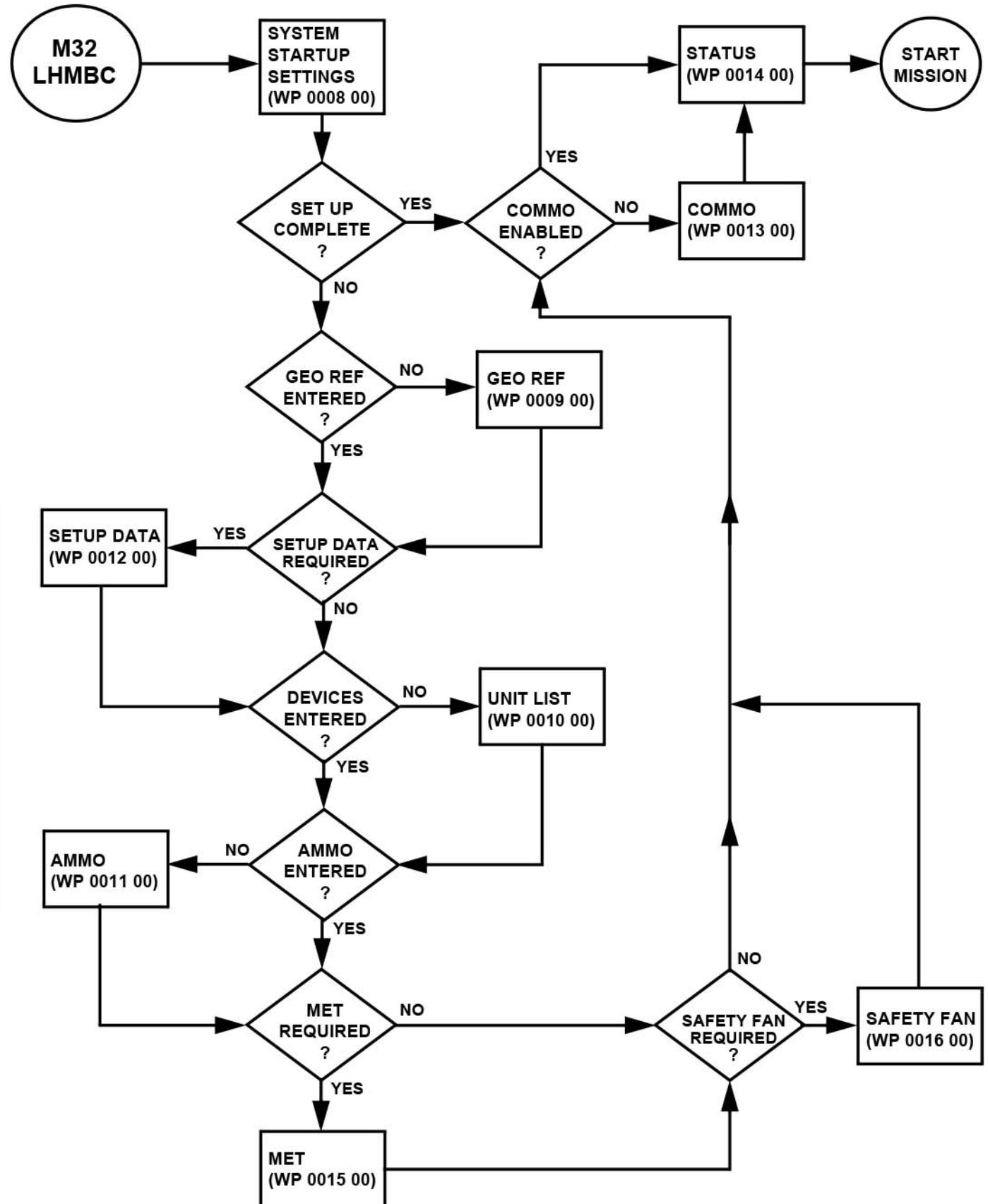


Figure 1. Flowchart for Setting Up the M32 LHMBC.

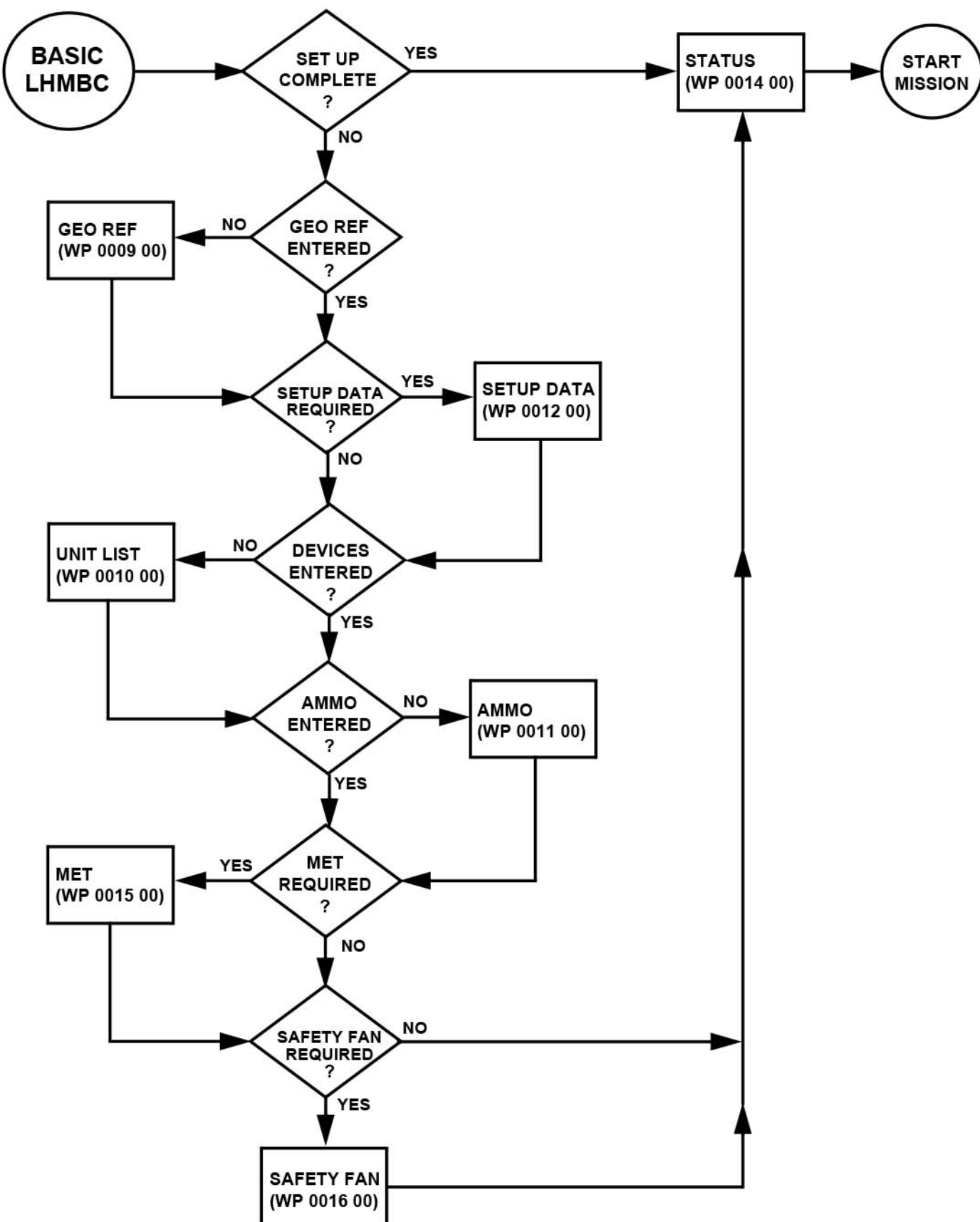


Figure 2. Flowchart for Setting Up the Basic LHMBC.

**EXITING LHMBC SOFTWARE**

To exit the LHMBC software, click the **Menu** control button located on the bottom left of most screens and select **Exit** from the Menu List. When the confirmation message is displayed, click **OK**.

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****SYSTEM STARTUP SETTINGS  
OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:**None

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**SYSTEM STARTUP SETTINGS**

System Startup Settings provides the means to set the Communications (Commo) and/or the Global Positioning System (GPS) to on or off. It is only available if using the M32 LHMBC. If using the Basic LHMBC, the System Startup Settings is never displayed.

**System Startup Settings Screen**

If using the M32 LHMBC, the System Startup Settings screen is automatically displayed when the LHMBC software is started.

**Communications (Commo On/Commo Off)** and **GPS (GPS On/GPS Off)** are set by clicking the button next to the desired setting. By default, the Commo is set to off and the GPS is set to on. If one of the functions is set to off, that function is not available in the LHMBC software (e.g., it is not listed on the Menu List).

To change the Commo and/or GPS settings, the LHMBC software must be exited and restarted.

System Startup Settings

<b>Communications</b>	
<input type="radio"/> Commo On	<input checked="" type="radio"/> Commo Off

<b>GPS</b>	
<input checked="" type="radio"/> GPS On	<input type="radio"/> GPS Off

Cancel	Use All
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**END OF WORK PACKAGE**

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## OPERATOR MAINTENANCE

### LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

### GEOGRAPHICAL REFERENCE (GEO REF) OPERATION UNDER USUAL CONDITIONS

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#### INITIAL SETUP:

None

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#### GEOGRAPHICAL REFERENCE (GEO REF)

Geo Ref provides the means to view or enter the ellipsoid, datum, and map mod boundaries.

#### Setup Geographical Reference Screen

The Setup Geographical Reference is displayed by clicking **Menu/Setup/Geo Ref**. The screen is automatically displayed when the LHMBBC software is started if no Geo Ref was previously set.

Setup Geographical Reference

Ellipsoid	WGS 1984		
Datum	WE - WORLD GEODETIC SYS		
<b>Minimum</b>			
Easting	Northing	Zone	Hemi
687000	3569000	16	<input checked="" type="radio"/> North <input type="radio"/> South
<b>Maximum</b>			
Easting	Northing	Zone	Hemi
786999	3668999	16	<input checked="" type="radio"/> North <input type="radio"/> South

Cancel      Use All

- The default **Ellipsoid** is **WGS 1984**. Setting the **Ellipsoid** to **<All>** allows all datums to be viewed.
- The default **Datum** is **WE - World Geodetic System 1984**. When the **Ellipsoid** is set, the corresponding default **Datum** is automatically entered.

### NOTE

The Map Mod cannot be adjusted during active missions.

The **Maximum Easting**, **Northing**, **Zone** (grid zone), and **Hemi** (hemisphere) entries are read-only. They are auto-filled based on the entered **Minimum** values.

- The **Minimum Easting** must be 6 digits. The **Maximum Easting** will be filled in automatically.
- The **Minimum Northing** for Northern Hemisphere must be 7 digits. The **Minimum Northing** for the Southern Hemisphere must be 7 digits. The **Maximum Northing** will be filled in automatically.



**GEOGRAPHICAL REFERENCE (GEO REF) - Continued****Setup Geographical Reference Screen - Continued**

- e. The **Minimum Zone** must be within the range of 1 to 60. The **Maximum Zone** will be filled in automatically.
- f. Change the **Minimum Hemi** by clicking the button beside **North** or **South**. The **Maximum Hemi** will be filled in automatically.

**NOTE**

Clicking **Use All** will display the Unit List screen.

**END OF WORK PACKAGE**

## OPERATOR MAINTENANCE

### LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

#### UNIT LIST OPERATION UNDER USUAL CONDITIONS

#### INITIAL SETUP:

##### References

WP 0006 00

#### UNIT LIST

Unit List provides the means to view, add, edit, or delete a unit name, device type, observer number, weapon, mount, mounting azimuth, reference, propellant temperature, and position. Any unit the operator needs to communicate with must be on this list. There is a limit of 100 entries.

#### Unit List Screen

The Unit List screen is displayed by clicking **Menu/Unit List**. The screen is automatically displayed when the LHMBC software is started if no devices were previously entered. The FDC is automatically on the list and cannot be deleted.

Unit List

Unit	Device	Obs	Wpn	Mount	
A1	GUN	99	M252	GROUND	▲
A2	GUN	98	M252	GROUND	≡
A3	GUN	97	M252	GROUND	
A4	GUN	96	M252	GROUND	▼
FDC	FDC				

◀ III ▶

Ammo List

Delete	Edit All Guns
Clear Position	Edit Unit
Clear Gun Posns	Add New

**Ammo List** - Displays the Ammunition screen.

**Clear Position** - Clears the position of a selected unit.

**Clear Gun Posns** - Clears the positions for all the guns at the same time.

## UNIT LIST - Continued

## Add Unit/Edit Unit Screen

The Unit List Add/Edit screen is displayed by clicking **Add Unit** or by clicking on the unit data line and clicking **Edit Unit**.

## NOTE

If using the M32 LHMBC with the GPS turned off or if using the Basic LHMBC, the **GPS** control button under **Position** is not displayed.

Unit List Add/Edit

Device

Obs Num

**Position**

Unit List Add/Edit

Device

Obs Num

Weapon Type

Mnt Az

**Position**

01600 93450 0150 16 N WE

- a. The **Device** selection is **FDC**, **FO**, **FSE**, **GUN**, **OR STA**, or **OTHER**.

The required entries change depending on the **Device** selected. If **FSE** is selected, there is the option to make that **FSE** the controlling **FSE**. If **GUN** is selected, entry boxes are displayed for the weapon type, mounting azimuth, reference, propellant temperature, and position.

The selection of **OTHER** allows the operator to enter any other friendly unit that does not meet any of the other criteria, but the operator may still need to communicate with them. It will also provide their location for fratricide checks.

- b. The **Unit Name** can be 2 to 4 characters. The first character must be a letter.
- c. An **Obs Num** must be assigned to each unit that will be an observer.
- d. If the **Device** is a gun, the following data can be entered. It can be entered for all guns at the same by clicking **Edit All Guns** from the Unit List screen.
- (1) A **Weapon Type** must be selected from the list.
  - (2) The **Mnt Az** must be a number within the range of 0000 to 6399.
  - (3) 700, 2800 and 3200 are listed for **Ref**. A different **Ref** can be entered within a range of 0000 to 6399.
  - (4) The **Prop Temp** defaults to +70 but can be changed.
- e. The **Position** is entered manually or, if using the M32 LHMBC with the GPS turned on, by clicking **GPS** to auto-fill the position based on the satellite information. (See WP 0006 00 for information about the positions).

---

## Edit All Guns Screen

The Edit All Guns screen is displayed by clicking **Edit All Guns** from the Unit List screen. The data can be entered for all the guns at the same time.

Edit All Guns

Weapon Type

Mnt Az  Ref

Prop Temp

Clear All

Cancel

Use All

- a. A **Weapon Type** must be selected from the list.
- b. The **Mnt Az** must be a number within the range of 0000 to 6399.
- c. 700, 2800 and 3200 are listed for **Ref**. A different **Ref** can be entered within a range of 0000 to 6399.
- d. The **Prop Temp** defaults to +70 but can be changed.

**END OF WORK PACKAGE**

**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****AMMUNITION (AMMO)  
OPERATION UNDER USUAL CONDITIONS****INITIAL SETUP:**

None

**AMMUNITION (AMMO)**

Ammo provides the means to view, add, edit, or delete the lot, shell and fuze, quantity, and lot number for the guns entered on the Unit List. It also provides the means to view the total amount (roll up) of ammunition.

**AMMO LIST****Ammunition Screen**

The Ammunition screen is displayed by clicking **Menu/Ammo/Ammo List**.

Ammunition

Unit	Lot	Shell-Fuze	Qu
A1	A	HE M821A2 - M734A1	100
A1	B	IL M853A1 - M772	100
A1	C	WP M375A3 - M524	200
A2	A	HE M821A2 - M734A1	100
A2	B	IL M853A1 - M772	100
A2	C	WP M375A3 - M524	200
A3	A	HE M821A2 - M734A1	100
A3	B	IL M853A1 - M772	100
◀ III ▶			

Delete

Edit Ammo

Add New

**AMMO LIST - Continued****Ammunition Add/Edit Screen**

The Ammunition Add/Edit screen is displayed by clicking **Add New** or by clicking on the ammunition data line and clicking **Edit Ammo**. When editing, the quantity is the only entry that can be changed.

Ammunition Add/Edit

Unit

Lot

Shell - Fuze

Lot Number

Quantity

Ammunition Add/Edit

Unit

Lot

Shell - Fuze

Lot Number

Quantity

- a. Once the **Unit** is entered, the entry is read-only. The **Unit** can be changed by clicking **Clear All**.
- b. When a **Lot** is assigned to a unit, that lot will no longer be on the selection list for that unit. For example, if Unit A1 is assigned Lot A, "A" is not displayed on the lot selection list when Unit A1 is assigned other ammunition because Lot A is already in use.

Previously defined lots will display the shell and fuze assigned to that lot. For example, if Lot A contains shell HE M821A1 and fuze M734, "A->HE M821A1 - M734" is displayed for Lot A.

- c. The **Shell-Fuze** and **Lot Number** will automatically fill in when a lot is selected that already has the shell, fuze, and lot number assigned.
- d. The **Quantity** will be the only entry that can be entered if a Lot is selected that has already been filled.



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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**SETUP DATA**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:****References**

WP 0040 00

**SETUP DATA**

Setup Data provides the means to view or set the system date, time, security mode, target block, splash message (if using communications), and audio alarm.

**Setup Data Screen**

The Setup Data screen is displayed by clicking **Menu/Setup/Data**.

**NOTE**

If using the M32 LHMBC with the GPS turned off or if using the Basic LHMBC, the **GPS Time** control button is not displayed.

Setup Data			
Date	Time		
21 Mar 2005	1442.47		
Security Mode UNCLASSIFIED			
<b>Target Block</b>			
Prefix	Min	Max	Next
AB	1	100	1
Send splash message 5 seconds before impact			
<input checked="" type="checkbox"/> Audio Alarm			
Cancel		GPS Time Use All	

- a. The **Date** and **Time** continually update until they are manually changed or, if using the M32 LHMBC with the GPS turned on, until they are auto-filled with the GPS time by clicking **GPS Time**. If using the M32 LHMBC with the Commo enabled, ZULU time must be used or a communications problem will occur.



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**SETUP DATA - Continued****Setup Data Screen - Continued**

- b. The **Security Mode** is set to **UNCLASSIFIED** by default. If another unit wants to call in classified information and the security mode is set to **UNCLASSIFIED**, the FDC needs to change the classification to **CONFIDENTIAL** or **SECRET**, as appropriate, or the classified message will not be processed.

The security banner for **UNCLASSIFIED** is green. The security banner for **CONFIDENTIAL** is blue. The security banner for **SECRET** is red.

**NOTE**

When the security level is classified, the system must be treated as secure until the security mode is reset by clicking **Clear Data** in the LHMBC Maintenance Application (see WP 0040 00).

- c. The **Target Block Prefix** must be 2 characters within the range of AA to ZZ. If a target number is sent with a prefix other than the prefix entered in setup, the sent target number is saved.
- d. The **Target Block Min** must be within the range of 0 to 9999.
- e. The **Target Block Max** must be within the range of 1 to 9999.
- f. The **Target Block Next** must be within the range of 0 to 9999.
- g. A time can be set for the amount of seconds a splash message is sent before impact.
- h. The **Audio Alarm** is turned on and off by clicking in the box. A check in the box means the audio alarm is turned on; a blank box means the audio alarm is turned off. If turned on, the alarm goes off for any incoming message.

**END OF WORK PACKAGE**

## OPERATOR MAINTENANCE

### LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

### COMMUNICATIONS (COMMO) OPERATION UNDER USUAL CONDITIONS

#### INITIAL SETUP:

##### References

WP 0056 00

#### COMMUNICATIONS (COMMO)

Commo provides the means to view or edit channel parameters and addresses required to establish communication, disable a channel, check send status, read or send a Plain Text Message (PTM), and check the fire unit status.

The LHMBC will digitally communicate on the fire support network with Advanced Field Artillery Tactical Data System (AFATDS w/PKG11), Forward Observer System (FOS w/Version 12), and legacy systems to seamlessly integrate mortar fires into the digital fire support network. See WP 0056 00 for additional information on FOS Version 7 Series.

#### CHANNEL PARAMS

Communications can be established either through radio or 2 wire.

#### Setup Commo Parameters Screen

The Setup Commo Parameters screen is displayed by clicking **Menu/Commo/Channel Params**.

Setup Commo Parameters

Tcim	Channel Status	Protocol
1	ACTIVE	A220
Dev Type	Comsec Mode	Nad Method
2 WIRE	PLAIN TE	DAPNAD
Modulation	Fh Mode	Net Usage
FSK-188C	SINGLE C	DATA ON
Data Rate	Rank	Num Stations
1200	4	10
Edc Mode	Defaults	
FEC_TDC	Radio Wire	

- a. The **Tcim** always uses Channel 1.
- b. The **Channel Status** will be **DISABLED**, **ACTIVE**, **FAILED**, or **INACTIVE**.
- c. The **Protocol** always uses **A220**.
- d. The **Dev Type** can be **2 WIRE** or **SINGGARS**.
- e. The **Comsec Mode** can be **CIPHER TEXT** or **PLAIN TEXT** for radio; **PLAIN TEXT** for wire.
- f. The **Nad Method** can be **DAPNAD**, **HYBRED**, **PRIORITY**, **RANDOM**, **RROBIN**.

## CHANNEL PARAMS - Continued

### Setup Commo Parameters Screen - Continued

- g. The **Modulation** can be **FSK-188C** or **NRZ** for radio; **CDP** or **FSK-188C** for wire.
- h. The **Fh Mode** can be **FREQ HOPPING** or **SINGLE CHN** for radio; **SINGLE CHN** for wire.
- i. The **Net Usage** can be **DATA ONLY** or **VOICE & DATA**.
- j. The **Data Rate** can be **2400** or **4800** for radio; **1200** or **600** for wire.
- k. The **Num Stations** is the number of units communicating, including the operator.
- l. The **Rank** is a unit's unique rank.
- m. The **Edc Mode** can be **DOUBLE\_FEC\_TDC**, **FEC\_ONLY**, **FEC\_SCRAMBLING**, **FEC - TDC**, **FEC\_TDC\_SCRAMBLING**, **NO\_EDC**, or **SCRAMBING ONLY**.
- n. The **Defaults** can be **Radio** or **Wire**. The parameters information can be auto-filled with either radio or wire default settings by clicking **Radio** or **Wire**. See WP 0056 00 for the default radio and wire settings.

### NOTE

Clicking **Use All** displays the Setup Commo Addresses screen.

## CHANNEL ADDR

### Setup Commo Addresses Screen

The Setup Commo Addresses screen is displayed by clicking **Menu/Commo/Channel Addr**s. All units on the Unit List except guns are listed. The FDC address must be entered before the address for other units. A green check under **En** means communications will be established with this unit once the communications channel is enabled.

Setup Commo Addresses

En	Unit	IP Address	URN
✓	FDC	130.139.112.031	612
✓	FO	130.139.112.040	0
	FSE		

Clear Address

Edit Address

## Edit Commo Address Screen

The Edit Commo Address screen is displayed by clicking on a unit and **Edit Address**. The unit's name displayed at the top of the screen.

Edit Commo Address

Unit Name: F0

En: ☒

IP Address: 130.139.112.040

Modem Address: 040

URN: 0

- a. The **En** (Enable) box is read-only for the FDC and is empty (unchecked) for other units if an IP Address has not been entered and saved.
- b. The **IP Address** has four sets of numbers (3 digits in each set) and each set must be followed by a period e.g., 130.139.112.031). The first set must be from 128 through 254. The second set must be from 001 through 254. The third set must be from 001 through 254. The fourth set must be from 004 through 095. The IP Address must be entered for the FDC. It is auto-filled for other units. The Setup Commo Addresses screen can hold up to 100 units and associated IP Addresses.
- c. The **Modem Address** is auto-filled when the IP Address for the FDC is entered. It must be entered for other units and be within the range of 4 to 95.
- d. The **URN** must be within the range of 0 to 16777215.

## ENABLE CHANNEL/DISABLE CHANNEL

A channel is enabled by clicking **Menu/Commo/Enable Channel**. A channel is disabled by clicking **Menu/Commo/Disable Channel**.

## SEND STATUS

Send Status is functional when a channel is enabled.

### Send Status Screen

The Send Status screen is displayed by clicking **Menu/Commo/Send Status**. It is displayed automatically when a message is sent.

**Status** will show **MACK** (machine acknowledgement), **Retry** (the system is retrying), or **Failed** (the message did not reach the destination). After three unsuccessful attempts to send a message, the status displays **Failed**. A status can be checked at any time. Once a MACK is received, the message is deleted from the list after 30 seconds.

Send Status

Dest	MsgType	Status	DTG

Delete All

Delete

Close

Resend

Resend All

**Resend** - Resends a selected failed message.

**Resend All** - Resends all failed messages.

## PLAIN TEXT MESSAGES (PTM)

### PTM Read Screen

The PTM Read screen is displayed by clicking **Menu/Commo/PTM/PTM Read**. A selected message is displayed in the log box.

PTM Read

Pri	From	Description	OrigDTG	Rc

Delete All

Op Ack

Delete

Reply

**Reply** - Displays the PTM Send screen so a PTM can be sent to the message originator.

## PTM Send Screen

The PTM Send screen is displayed by clicking **Menu/Commo/PTM/PTM Send**.

PTM Send

		▲
		▼

Unit Name	Check All
<input type="checkbox"/> FO	Check None

ClearSend

**Unit Name** - Lists the unit(s) to which a PTM can be sent.

**Check All** - Selects all the units (checks all boxes) under **Unit Name**.

**Check None** - Deselects any selected unit (unchecks all boxes) under **Unit Name**.

**Clear** - Clears message from log box and deselects all units under **Unit Name**.

**Send** - Sends the PTM once it is typed. The Send Status screen is displayed.

## FIRE UNIT STATUS

### Fire Unit Status Screen

The Fire Unit Status screen is displayed by clicking **Menu/Commo/Fire Unit Status**.

Fire Unit Status

# Guns:	<input type="text" value="4"/>	OpStatus:	OpRdy	
AOF:	<input type="text"/>			
Easting	Northing	Alt	Zone	Hemi
<input type="text" value="01545"/>	<input type="text" value="93442"/>	<input type="text" value="150"/>	<input type="text" value="16"/>	<input checked="" type="radio"/> North <input type="radio"/> South
<input type="button" value="OpOut"/>	<input type="button" value="OpRdy"/>	<input type="button" value="Resend"/>		

<input type="button" value="Get FU Center"/>	
<input type="button" value="Get # Guns"/>	<input type="button" value="Save"/>

- a. The **# Guns** must be within the range of 0 thru 18 and is auto-filled based on the number of guns enabled.
- b. The **AOF** (Azimuth of Fire) must be 4 digits.
- c. The **Easting** must be 5 digits.
- d. The **Northing** must be 5 digits.
- e. The **Altitude** can be up to 4 digits.
- f. The **Zone** is read-only. It is auto-filled based on the Geo Ref.
- g. The **Hemi** is read-only. It is auto-filled based on the Geo Ref.

### NOTE

If a controlling FSE is not on the Unit List, **OpOut**, **OpRdy**, and **Resend** will not be enabled.

**OpOut** - Sends an OPOUT status message to the controlling FSE.

**OpRdy** - Sends and OPRDY status message to the controlling FSE.

**Resend** - Sends the data currently displayed on the screen.

**Get FU Center** - Enters the Fire Unit (FU) center point of all available guns for **Easting** and **Northing**.

**Get # Guns** - Enters the number of guns enabled for the **# Guns**.

**Save** - Saves the fire unit status.

### END OF WORK PACKAGE

**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**STATUS**  
**OPERATION UNDER USUAL CONDITIONS**

## INITIAL SETUP:

### References

WP 0011 00  
 WP 0013 00  
 WP 0015 00

## STATUS

Status provides the means to view the operational status, mission number, Final Protective Fire (FPF) number, and ammunition for the guns entered on the Unit List.

### Status Screen

The Status screen is displayed by clicking **Menu/Status**. The Status screen is for information purposes only.

Status  
External Power: YES

Gun	Status	Msn	FPF	HE	WP	ILL
A1	OPRDY					
A2	OPRDY					
A3	OPOUT					
A4	OPOUT					

Commo Status is DISABLED  
 Standard MET  
 Version V2.1 D3 B1  
 BK Version 1.36

Status  
External Power: NO

Gun	Status	Msn	FPF	HE	WP
A1	OPRDY	AB0001		100	200
A2	OPRDY	AB0001		100	200
A3	OPRDY	AB0001		100	200
A4	OPRDY	AB0001		100	200

Commo Status is ACTIVE  
 Current MET 1016.24 09Apr2005  
 Version V2.1 D3 B1  
 BK Version 1.36

- The **External Power** is **YES** (in green) if external power is connected or **NO** (in red) if no external power is connected.
- A gun's **Status** is **OPRDY** (with green background) if the gun has a position, mounting azimuth, reference, and weapon type. The gun's status is **OPOUT** (with red background) if any of these fields are missing.
- When a gun is assigned a mission, the mission number is displayed under **Msn** or **FPF** (if the mission is an FPF mission).
- The number of rounds is displayed under **HE** (High Explosive), **WP** (White Phosphorus), **ILL** (Illumination) and/or **IR** (Infrared). These columns are empty until ammunition is entered. (See WP 0011 00 for information on the Ammunition.)



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**STATUS - Continued****Status Screen - Continued**

- e. The **Commo Status** is only displayed when using the M32 LHMBC with the Commo turned on. It is **ACTIVE** if communications is enabled or **DISABLED** if communications not enabled. (See WP 0013 00 for information on the Commo.)
- f. The MET (Meteorological) is displayed as **Standard MET** or **Current MET**. Current MET displays the time and date the current MET was applied. ( See WP 0015 00 for information on the MET).
- g. The LHMBC software version, drop, and build (e.g., **Version V2.1 D3 B1**) and the Ballistic Kernel (BK) version (e.g., **BK Version 1.36**) are displayed. This information is needed for software troubleshooting support.

**END OF WORK PACKAGE**

**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**METEOROLOGICAL (MET)**  
**OPERATION UNDER USUAL CONDITIONS**

**INITIAL SETUP:**

None

**MET**

MET provides the means to view, add, edit, or delete MET information, and to receive and process MET messages.

**Met Current Screen**

The Met Current screen is displayed by clicking **Menu/Met/Current**. The screen displays the current MET being used (e.g., the Standard MET or a customized MET previously entered). The information on the screen is read-only.

Met Standard

Using Standard MET

	Alt	Dir	Speed	Temp	Pres	
0	0	160	7	2900	977	▲
1	200	187	11	2887	965	≡
2	500	220	15	2878	937	
3	1000	248	17	2868	893	
4	1500	278	13	2852	842	
5	2000	320	11	2830	793	
6	2500	362	13	2796	746	
7	3000	378	16	2766	701	▼
◀    ▶						

Orange indicates abnormal MET trends

Current MET 1645.20 21Mar2005

Use Current

View Station

Use Standard

**Use Current** - Changes the system from the Standard MET to a customized MET and displays the Met Current screen. **Use Current** is only displayed if a customized MET was entered.

**View Station** - Displays the Met View Station screen with the details of the Station entered. (**View Lines** displayed on the Met View Station screen displays the Met Current screen.)

**Use Standard** - Changes the system from a customized MET to the Standard MET and displays the Met Current screen.

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**MET - Continued****Met Edit Station Screen**

The Met Edit Station screen is displayed by clicking **Edit Station** from the Met New screen.

Met Edit Station

Station Name	<input type="text" value="METCM"/>	
Octant	<input type="text" value="0"/>	
Station Height	<input type="text" value="37"/>	10s of meters
MDP Pressure	<input type="text" value="977"/>	
Latitude	<input type="text" value="347"/>	
Longitude	<input type="text" value="983"/>	

Clear All	
Cancel	Use All

- a. The **Station Name** is a user-defined name of the station.
- b. The **Octant** can be 0 to 9 digits.
- c. The **Station Height** (10s of meters) must be within the range of -40 to 999.
- d. The **MDP Pressure** must be within the range of 0 to 1100.
- e. The **Latitude** must be within the range of 0 to 900.
- f. The **Longitude** must be within the range of 0 to 999.

## Met New Screen

The following is a list of parameter thresholds. Comparisons are made to the previous and following lines. When exceeded, a visual indication will be made on the Met Current screen (the information will be highlighted in orange). Met information will not be applied if less than 8 lines have been entered.

Direction - If the delta is more than 100 (10s of mils)

Speed - If the delta is more than 15 (knots)

Temperature - If the delta is more than 20 (degrees K)

Pressure - If the air pressure increases on a higher line number (pressure should decrease as altitude increases)

## NOTE

The presence of orange cells does not necessarily mean the MET is invalid. Call the FSE to validate the MET before applying.

The Met New screen is displayed by clicking **Menu/Met/New**.

Met New

	Alt	Dir	Speed	Temp	Press	
0	0					
1	200					
2	500					
3	1000					
4	1500					
5	2000					
6	2500					
7	3000					

Orange indicates abnormal MET trends

Clear Line	Edit Station
Clear All	Edit Line
Cancel	Apply New Met

Met New

	Alt	Dir	Speed	Temp	Press	
0	0	160	7	2900	977	
1	200	187	11	2887	965	
2	500	220	15	2878	937	
3	1000	248	17	2868	893	
4	1500	278	13	2852	842	
5	2000	320	11	2830	793	
6	2500	362	13	2796	746	
7	3000	378	16	2766	701	

Orange indicates abnormal MET trends

Clear Line	Edit Station
Clear All	Edit Line
Cancel	Apply New Met

**Clear Line** - Clears the MET data for the selected line.

**Clear All** - Clears the MET data for all lines.

**Apply New Met** - Changes the system to the customized MET and displays the Status screen.

## MET - Continued

### Met New Edit Line Screen

The Met New Edit Lines screen is displayed by clicking **Edit Line** from the Met New screen. The **Line** and **Altitude** are read-only.

Met New Edit Lines

Line	0	Altitude	0	
Direction				<input style="width: 80px;" type="text" value="160"/>
Speed				<input style="width: 80px;" type="text" value="7"/>
Temperature				<input style="width: 80px;" type="text" value="2900"/>
Pressure				<input style="width: 80px;" type="text" value="977"/>

Clear All

Next Line

Cancel

Use All

- a. The **Direction** is the wind direction (10s of mils) and must be within the range of 0 to 639 mils.
- b. The **Speed** is the wind speed and must be within the range of 0 to 199 knots.
- c. The **Temperature** must be within the range of 1500 to 3999 degrees K.
- d. The **Pressure** must be within the range of 1 to 1999.

**Next Line** - Displays the next **Line** and **Altitude** without having to return to the Met New screen.

### Met Messages Screen

The Met Messages screen is displayed by clicking **Menu/Met/Messages**.

Met Messages

	Pri	From	Desc	RecDTG	OrigDTG

Delete

Op Ack

Process

**Process** - Applies the Met Sent in the selected message.

## END OF WORK PACKAGE

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**SAFETY FAN**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:**

**References**

WP 0006 00

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**SAFETY FAN**

Safety Fan provides the means to add or edit safety fan segments. There can be only one safety fan containing up to ten fan segments. A safety fan is defined by the left and right azimuths, minimum and maximum ranges, minimum and maximum charges, ammunition allowed, and fan origin.

Once the safety fan is correctly entered, the safety fan is always in effect until it is deleted.

The operator will be alerted of any safety fan violations for all aimpoints for all weapons when gun orders are computed. The operator will not be permitted to override a safety fan violation and gun orders will not be displayed. A safety fan violation will occur when the burst point and/or fail point is located outside the safety fan area and/or a computed or operator entered charge is outside the charge range and/or using disallowed ammunition.

**Ballistic Solution Warning**

A warning message is displayed if any ballistic solution violates the safety fan or if the ballistics solution endangers any stored friendly location (FOs and weapon) when the initial aim point and fail point (if illumination round canister) is within the Boundary Outer Limit Alert Distances (BOLAD).

The following BOLAD values are added to the area surrounding the grid locations of friendly locations:

- 100 meters for 60mm ammunition
- 150 meters for 81mm including M303 Insert ammunition
- 200 meters for 120mm ammunition
- 250 meters for 120mm M57 and M91 ammunition.

## SAFETY FAN - Continued

### Safety Fan Segments Screen

The Safety Fan Segments screen is displayed by clicking **Menu/Setup/Safety Fan**. Safety fan segments added after the first safety fan are adjacent to the previous segment's right azimuth.

Safety Fan Segment			
Segment	LeftAz	RightAz	MinRange
1	3440	4460	2500
2	4460	4600	4000

Del All Segments	Edit Segment
Del Segment	Add Segment

**Del All Segments** - Deletes all the segments at the same time.

**Del Segment** - Deletes a selected segment. They must be deleted in decreasing order.

### Add Segment/Edit Segment

The Add New Safety Fan Segment screen is displayed by clicking **Add Segment** or by clicking on a segment data line and clicking **Edit Segment**.

The safety fan segments are entered in a clockwise direction. The difference between the left azimuth of fan segment 1 and the right azimuth of the last fan segment entered must not exceed 3200 mils. Adjacent fan segments must share a common azimuth and have ranges that overlap each other. All fan segments must touch by having right azimuth from the current area being used as left azimuth for the next one.

Azimuth		Charge	
Left	3440	Min	0
Right	4460	Max	4
Range		Allowed Ammo	
Min	2500	<input checked="" type="checkbox"/> HE	<input checked="" type="checkbox"/> ILL
Max	5800	<input checked="" type="checkbox"/> WP	<input type="checkbox"/> IR
Origin			
19432	96854	0150	16 N WE
<input type="button" value="Edit"/>			

<input type="button" value="Clear All"/>	<input type="button" value="Use All"/>
<input type="button" value="Cancel"/>	

- a. The **Left Azimuth** must be within the range of 0000 to 6399. If a safety fan segment other than the first segment is being added or edited, the **Left Azimuth** is read-only.
- b. The **Right Azimuth** must be within the range of 0000 to 6399. If the first segment is being edited and it has an adjacent segment(s), the **Right Azimuth** is read-only.
- c. The **Min Range** must be within the range of 0 to 7999.
- d. The **Max Range** must within the range of 1 to 8000.
- e. The **Min Charge** is between 0 to 9.
- f. The **Max Charge** is between 0 to 10.
- g. The **Allowed Ammo** is **HE** (High Explosive), **ILL** (Illumination), **WP** (White Phosphorus), and **IR** (Infrared).
- h. The **Origin** is a position. It is auto-filled for safety fan segments other than the first safety fan. See WP 0006 00 for information on the position.

**END OF WORK PACKAGE**



**TARGETS/KNOWN POINTS**  
**OPERATION UNDER USUAL CONDITIONS**

## None

Add New

## TARGETS/KNOWN POINTS - Continued

### Add Target Screen

The Add Target screen is displayed by clicking **Add New** from the Targets screen.

Add Target

Easting	<input type="text" value="03938"/>
Northing	<input type="text" value="90762"/>
Altitude	<input type="text" value="110"/>
Datum	<input type="text" value="WE"/>
TgtNum	<input type="text" value="AB0002"/>
Grid Zone	<input type="text" value="16"/>

Clear All	Use All
Cancel	

- The **Easting** must be 5 digits.
- The **Northing** must be 5 digits.
- The **Altitude** must be within the range of -400 to 9999.
- The **Datum** is auto-filled based on the Geo Ref, but can be changed.
- The **TgtNum** must be a two alpha character (AA to ZZ) target number prefix followed by a 4-digit (0000 to 9999) target number (e.g., AA0002).
- The **Grid Zone** is read-only. It is auto-filled based on the Geo Ref.

### Known Points Screen

The Known Points screen is displayed by clicking **Menu/Points/Known Pts.**

Known Points

KnPt	Obs	TgtNum	Position
1	FO	AB0001	03179 90289 01

Clear TgtNum	Add New
Delete	

**Clear TgtNum** - Clears a selected target number.

## Add Known Point Screen

The Add Known Point screen is displayed by clicking **Add New** from the Known Points screen.

Add Known Point

Easting	<input type="text" value="03179"/>	
Northing	<input type="text" value="90289"/>	
Altitude	<input type="text" value="110"/>	
Datum	<input type="text" value="WE"/>	
TgtNum	<input type="text" value="AB0001"/>	Grid Zone <input type="text" value="16"/>
KnPt	<input type="text" value="1"/>	Obs <input type="text" value="FO"/>

Clear All	Use All
Cancel	

- a. The **Easting** must be 5 digits.
- b. The **Northing** must be 5 digits.
- c. The **Altitude** must be within the range of -400 to 9999.
- d. The **Datum** is auto-filled based on the Geo Ref, but can be changed.
- e. The **TgtNum** must be a two alpha character (AA to ZZ) target number prefix followed by a 4-digit (0000 to 9999) target number.
- f. The **KnPt** must be within the range of 0 to 99.
- g. The **Grid Zone** is read-only. It is auto-filled based on the Geo Ref.
- h. An **Obs** (Observer) must be selected (e.g., FO).

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**GLOBAL POSITIONING SYSTEM (GPS)**  
**OPERATION UNDER USUAL CONDITIONS**

---

**INITIAL SETUP:****References**

WP 0006 00  
WP 0012 00  
WP 0034 00  
WP 0040 00

---

**GLOBAL POSITIONING SYSTEM (GPS)****NOTE**

If the GPS exhibits intermittent functionality, the LHMBC can still be operated in a degraded mode (e.g., without the GPS function). If the problem continues, see troubleshooting (WP 0034 00).

A GPS Receiver is contained in the expansion pack on the M32 LHMBC. If the LHMBC software detects an expansion pack, it will provide the GPS capability if the GPS was turned on from the System Startup Settings screen.

The expansion pack has a built-in GPS antenna located in the dome assembly. An external GPS antenna can be connected to the LHMBC using the external GPS connector located on the right side of the expansion pack. To utilize the built-in GPS antenna, an external GPS antenna and external GPS antenna cable must be available. These items are on the Additional Authorization List (AAL) (see WP 0053 00).

When a valid GPS position is available, it can be auto-filled for a position (see WP 0006 00). When the GPS time and date are available, it can be auto-filled for the setup data (see WP 0012 00). The GPS time and date are ZULU.

**Operating GPS**

To obtain a GPS position there must be a correct Map Mod (Geo Ref).

After starting the LHMBC software, waking up from Sleep Mode or GPS Standby Mode, the initial position will be available within 20 minutes.

When keying the GPS the GPS Status screen must be displayed. The GPS key (fill) can be cleared from the LHMBC Maintenance Application (see WP 0040 00).

## GLOBAL POSITIONING SYSTEM (GPS) - Continued

### GPS Status Screen

The GPS Status screen is displayed by clicking **Menu/Setup/GPS**.

GPS Status	
Errors and Warnings	
Status	
000STATE: SEARCHING	
002GPS ACCURACY 0.00 M	
003 / 8 3 10 14 12	
004 8:0 3:0 10:0 14:0 12:0	
005ALMANAC AGE 65535 DAYS	
NOT KEYED	
Standby Mode	

**Errors and Warnings** - The LHMBC software passes through the **Errors and Warnings** from the GPS. A Warning will not necessarily prevent the GPS from functioning. If the GPS has a position available, disregard the warning and continue operations.

The GPS Warnings are as follows:

```

101INVALID KEY ENTERED
102BAD KEY DETECTED
103ALL KEYS ZEROIZED
104ZEROIZE FAILED
105NO KEY FOR TOMORROW
106CHECK GUV ISSUE NUMBER
107INSUFFICIENT Y-CODE SV
108POSSIBLE SPOOFERS
109LOW MEMORY BATTERY
10ALOW PRIMARY BATTERY
10BEXTERNAL ANTENNA LOST
10CEXTERNAL ANTENNA FAULT
10DEXTERNAL POWER LOST
10ENON RECHARGEABLE BATTERY
10FEMERGENCY ZEROIZE PASSED
110EMERGENCY ZEROIZE FAILED
111FAILURES FOUND - SEE FAIL LOG
112NO FAILURES DETECTED
113DATUM MISMATCH WPnnn AND WPFnnn
114THE RECEIVER HAS CLEARED MEMORY
115ROUTE UNDEFINED - RHRSL CANCELLED
GPS IN STANDBY MODE
  
```

The GPS Errors prevent the GPS from functioning. The errors are as follows:

```

200GPS NOT FUNCTIONAL
200GPS NOT COMMUNICATING
NO GEO REF ENTERED
  
```

**Status** - Provides the following information:

**000STATE:** - Displays one of the following: **INITIALIZE**, **SEARCHING**, **POSITION AVAILABLE**, or **UNKNOWN**.

**001POSITION** - This line shows the current position only when **000STATE:** displays **POSITION AVAILABLE**.

**002GPS ACCURACY** - Indicates the accuracy of the position in **001POSITION**. The LHMBC requires the accuracy to be 25 meters or less before it can be used.

**003** - Indicates the 5 satellite designation numbers the GPS is tracking (i.e., 21 10 14 15 29 means satellite #21, satellite #10, etc.). Satellites to the right of the "/" have poor signal strength.

**004** - Indicates the strength of a satellite signal. For example, 21:36 indicates satellite 21 has the strength of 36. A signal strength of 30-40 is usually strong enough for the GPS to receive data.

**005ALMANAC AGE** or **005NO ALMANAC** - Indicates the age of the almanac in days. **NO ALMANAC** or an old Almanac (i.e., a large number of days) may require a longer time for the GPS to acquire a position.

**006** - Displays one of the following crypto key status messages: **Not Keyed**, **No Key for Today**, **Contains todays key**, **Todays key incorrect**, **Waiting for SV Data**, **CV zeroize successful**, **CV zeroize failed** or **Key loaded**. GPS keys are required if satellite signals are scrambled.

**Standby Mode** - Turns off the GPS to save power. **Continuous Mode** - Turns on the GPS.

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****CHECK FIRE  
OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:**None

---

**CHECK FIRE**

Check Fire provides the means to send or receive a Check Fire. When a Check Fire All is sent or received, all active fire missions are halted. When a Check Fire by target number is sent or received, the selected mission is halted. Inactive fire missions cannot be activated. Check Fire can be implemented at any time during a mission.

**Check Fires Screen**

The Check Fires screen is displayed by clicking **Menu/Check Fire**. The screen shows the type of check fire, target number, if available, originator, received date-time-group, and originated date-time-group.

Check Fires

Type	Tgt	Orig
! CHECK_FIRE_ORDER	AB0001	FDC

◀ ||| ▶

AB0001 ▼

Cancel ChkFire

ChkFire All

ChkFire Tgt

Op Ack

**ChkFire All** - Sets the system into Check Fire All and all missions are automatically stopped.

**ChkFire Tgt** - Adds a Check Fire to a particular mission (e.g., AB0001). The message is displayed on the Check Fires screen and that mission is automatically stopped.

**Cancel ChkFire**. Cancels a selected Check Fire. Fire mission operations can then be continued.

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**

**ALERTS**  
**OPERATION UNDER USUAL CONDITIONS**

---

**INITIAL SETUP:**

None

---

**ALERTS**

Alerts provides a log of operational errors, warnings, and information. The queue holds up to 100 messages. When the alert limit is reached, a new alert deletes the oldest alert.

**Alerts Screen**

The Alerts screen is displayed by clicking **Menu/Alerts**. The screen displays the type, description, and date-time-group for the alerts received.

Alerts

Type	Description
! *	UNABLE TO CONFIG SPTCIM
! *	ERROR ON STARTUP; UNABL

◀ III ▶

Delete

Op Ack

Delete All

Op Ack All

X Menu

**Delete** - Deletes a selected alert.

**Delete All** - Deletes all alerts and displays the Status screen.

**Op Ack** - Acknowledges a selected alert.

**Op Ack All** - Acknowledges all alerts.

**END OF WORK PACKAGE**



**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**MANUAL MISSION SETUP**  
**OPERATION UNDER USUAL CONDITIONS**

**INITIAL SETUP:****References**

WP 0009 00  
 WP 0010 00  
 WP 0012 00  
 WP 0014 00

**References - Continued**

WP 0015 00  
 WP 0016 00  
 WP 0028 00  
 WP 0040 00

**GENERAL**

This work package provides the data that needs to be entered to perform the manual missions in this TM.

The examples for the manual missions in this TM were developed using the M32 LHMBC with the Commo and GPS turned off or the Basic LHMBC. If using the M32 LHMBC with the Commo turned on, some of the screens will be different than the examples because they will display control buttons available when Commo is on. These control buttons are discussed in WP 0028 00 (Digital Basic Fire Mission).

The LHMBC software V2.2 D1 B2 and BK 1.36 was used to develop the manual missions examples. Mission solutions may differ if a different software version is used. The software version information is located on the Status screen (see WP 0014 00) and the LHMBC Maintenance screen (see WP 0040 00).

**MANUAL MISSION SETUP****NOTE**

Refer to the following list for WPs containing detailed information about the screens in this WP.

Geographical Reference	WP 0009 00
Unit List	WP 0010 00
Ammunition	WP 0011 00
Setup Data	WP 0012 00
Met	WP 0015 00
Safety Fan	WP 0016 00

1. Click **Menu/Setup/Geo Ref** to enter the following data:

**Setup Geographical Reference**

Ellipsoid	Datum	Minimum			
		Easting	Northing	Zone	Hemi
WGS 1984	WE WORLD GEODETIC SYSTEM 1984	687000	3569000	16	North

**MANUAL MISSION SETUP - Continued**

2. Click **Menu/Setup/Data** to enter the following data:

**Setup Data**

Security Mode	Target Block				Splash	Audio Alarm
	Prefix	Min	Max	Next		
UNCLASSIFIED	AB	1	100	1	5 seconds	On

3. Click **Menu/Unit List** to enter the following data:

**Unit List**

Unit	Device	Obs	Wpn	Mount	Mnt Az	Use Ref	Prop Temp	Position
A1	GUN		M252	GROUND	2760	2800	70	01600 93450 0150 16 N WE
A2	GUN		M252	GROUND	2760	2800	70	01563 93435 0150 16 N WE
A3	GUN		M252	GROUND	2760	2800	70	01526 93419 0150 16 N WE
A4	GUN		M252	GROUND	2760	2800	70	01489 93404 0150 16 N WE
FDC	FDC							01528 93470 0150 16 N WE
FO	FO	1						00905 92350 0175 16 N WE
FSE	FSE							00905 92350 0175 16 N WE

4. Click **Menu/Ammo/Ammo List** (or **Ammo List** from the Unit List screen) to enter the following data:

**Ammunition**

Unit	Lot	Shell-Fuze	Quantity	Lot Num
A1	A	HE M821A2-M734A1	100	A
A1	B	IL M853A1-M772	100	B
A1	C	WP M375A3-M524	200	C
A2	A	HE M821A2-M734A1	100	A
A2	B	IL M853A1-M772	100	B
A2	C	WP M375A3-M524	200	C
A3	A	HE M821A2-M734A1	100	A
A3	B	IL M853A1-M772	100	B
A3	C	WP M375A3-M524	200	C
A4	A	HE M821A2-M734A1	100	A
A4	B	IL M853A1-M772	100	B
A4	C	WP M375A3-M524	200	C

5. Unless a Registration mission is being performed, click **Menu/Met/Current** to ensure the MET is set to **Standard MET**. If performing a Registration mission, click **Menu/Met/New** and enter the following data:

### Met Station

Station Name	Octant	Station Height	MDP Pressure	Latitude	Longitude
METCM	0	37	977	347	983

### Met Current

	Alt	Dir	Speed	Temp	Press
0	0	160	7	2900	977
1	200	187	11	2887	965
2	500	220	15	2878	937
3	1000	248	17	2868	893
4	1500	278	13	2852	842
5	2000	320	11	2830	793
6	2500	362	13	2796	746
7	3000	378	16	2766	701
8	3500	384	17	2737	659

6. If performing a Registration mission, click **Menu/Setup/Safety Fan** to enter the following data:

### Safety Fan

Segment	Left Az	Right Az	Min Range	Max Range	Min Charge	Max Charge	Ammo Allowed	Origin
1	2360	3160	2500	5800	0	4	HE ILL WP	01563 93435 0150 16 N WE
2	3160	4700	4000	5000	2	4	HE ILL WP	01563 93435 0150 16 N WE

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****MANUAL BASIC FIRE MISSIONS (GRID, SHIFT, POLAR, QUICK FIRE, DIRECT LAY, HIPSHOOT)  
OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:****Refernces**

DA Form 2399-R

**Equipment Conditions**Manual Mission Setup, WP 0021 00

---

**GENERAL**

This work package provides information on the mission screens and procedures for manually constructed Calls For Fire (CFF) for grid, polar, shift quick fire, direct lay, and hipshoot missions.

The LHMBC software can handle up to six active missions at a time.

**NOTE**

The data on the screens will vary depending on the type of mission information and adjustments selected.

**TARGET SCREEN**

When a mission is started, a Target screen is created for that mission and provides the means to review, verify, or adjust the mission. The target number (e.g., AB0001) is displayed at the top of the screen and there are control buttons for the operator to be able to review and verify mission information and to modify or end a mission.

A control button with the target number (e.g., **AB0001**) is displayed on all the mission screens when a mission is started. When clicked, the Target screen is displayed.

AB0001

Mission Log	Gun Select
Mission Data	Subs Adjust
Solution	Adj Sheaf
Safety Data	EOM
RePlot	Smoke Card

## MANUAL GRID MISSION

The following is an example of a manual grid mission with subsequent adjustments for Adjust Fire and Fire For Effect.

### NOTE

Prior to running this mission, enter only geo ref, setup data, devices, and ammo.

*FO calls:   Adjust Fire, Grid  
              03110 90199 110  
              Trucks in wood line  
              Use HEQ in Adj, HED in FFE  
              Fire When Ready*

### Grid Mission Screen

The Grid Mission screen provides the means to start a mission using grid coordinates.

1. Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	HE ADJ ▼
Easting	03110
Northing	90199
Altitude	110
Zone	16
Datum	WE ▼
Obs Tgt Azim	

Cancel
Use All

- a. There are eight types of missions listed under the **Mission Type**. The types of missions are Adjust Fire (**HE ADJ/ILL ADJ**), Fire For Effect (**HE FFE/ILL FFE**), Suppression (**SUPPRESS**), Immediate Smoke (**IM SMOKE**), **REGISTRATION**, or Final Protective Fire (**FPF**). The default is **HE ADJ**.
- b. The **Easting** must be 5 digits.
- c. The **Northing** must be 5 digits.
- d. The **Altitude** must be within the range of -400 to 9999.
- e. The **Zone** is auto-filled based on the Geo Ref and is read-only.
- f. The **Datum** is auto-filled based on the Geo Ref. Although another **Datum** can be selected from the list, it will not be saved.

### NOTE

If the **Obs Tgt Azim** is not entered, subsequent adjustments will default to the gun target line (GTL).

- g. The **Obs Tgt Azim** (Observer Target Azimuth) is not required, but if entered must be within the range of 0 to 6399.

2. Enter the data as shown.

3. Click **Use All** to start the mission.

## Mission Data Screen

The Mission Data screen provides the means to review the mission data and make necessary modifications. The data defaults to the most common circumstances for the mission being processed.

The Mission Data screen is automatically displayed when a mission is started. The Mission Data screen can be displayed at any time by clicking **Mission Data** from the Target screen.

Mission Data

MOC WR ▼	Msn Type AREA	MOF ADJ	MOA N/G
Sheaf PARALLEL ▼			
Adj Gun A2 ▼	Lot-Shell A - HE Mē ▼	Fuze IMP ▼	Charge AUTO ▼
FFE Volleys 3	Lot-Shell A - HE Mē ▼	Fuze DLY ▼	Charge AUTO ▼
Use Reg Correction <input type="checkbox"/>			
AB0001		Use All	

- a. The Methods Of Control (**MOC**) include At My Command (**AMC**), Do Not Load (**DNL**), or Fire When Ready (**WR**). The default is **WR**.
- b. The Mission Type (**Msn Type**), Method Of Fire (**MOF**), and Method Of Adjustment (**MOA**) are read-only. The Mission Types include Area, Assign FPF, Continuous Illumination, Coordinated Illumination, Final Protective Fire (FPF), Illumination, Immediate Smoke, Immediate Suppression, Record As, and Registration. The Methods Of Fire (**MOF**) include Adjust Fire (**ADJ**), Continuous (**CONT**), Fire For Effect (**FFE**), Repeat Fire For Effect (**RFFE**). The Methods of Adjustment (**MOA**) include Danger Close (**DNG CLS**), Not Given (**N/G**), and Registration (**REG**).
- c. The Sheafs (**Sheaf**) include **LINEAR**, **OPEN**, **CONVERGE**, **SPECIAL**, **PARALLEL** and Search/Traverse (**SRCH/TRAV**). The default is **PARALLEL**.
- d. The adjustment gun (**Adj Gun**) is defaulted to the gun nearest the center of the firing unit in relationship to the target. It requires information for the **Lot-Shell**, **Fuze**, and **Charge**, unless the mission is a Fire For Effect (FFE), in which case the information is read-only because it is not needed.
- e. The FDC determines the **FFE Volleys**. It must be within the range of 0 to 99. The default is 3. There needs to be enough ammunition for each gun to fire the number of volleys entered. The **FFE Volleys** requires information for the **Lot-Shell**, **Fuze**, and **Charge**.
- f. The **Lot-Shell** only lists the appropriate ammunition for the mission that was entered on the Ammunition List.
- g. The **Fuze** will be auto-filled based on the type of ammunition selected but can be changed. The three types of fuzes are Impact (**IMP**), Delay (**DLY**), and Proximity (**PRX**). The default is **IMP**.

## MANUAL GRID MISSION - Continued

### Mission Data Screen - Continued

- h. The **Charge** defaults to **AUTO** (for automatically selecting the correct charge for the range entered) but can be set 0 to 4.
  - i. If a Registration Point (RP) is recorded, the Azimuth Correction Factor (AzCF) and Range Correction Factor (RngCF) for the RP is displayed and the **Use Reg Correction** is selected to be applied to the current mission. It can be deselected if it is not needed for the mission.
1. Verify or change the data. The **Adj Gun** defaults to **A3** and needs to be changed **A2**. The FFE **Fuze** defaults to **IMP** and needs to be changed to **DLY**.
  2. Click **Use All** to save any changed data and to continue the mission.

### Errors and Warnings Screen

#### NOTE

If there are no solution errors or warnings, the Errors and Warning screen is not displayed. The following is for informational purposes only.

The Errors and Warnings screen is displayed if there are any solution errors or warnings with the mission data.

If errors are indicated which **cannot be corrected**, the operator's only choice is to end the mission.

If warnings are indicated which **cannot be corrected**, the operator may continue the mission if authorized.

The operator can change the gun selection based on errors and warnings if the situation warrants it.

Errors and Warnings

Type	Gun	Description
✖	A1	FFE NO SOLUTION
✖	A2	FFE NO SOLUTION
✖	A3	ADJ AIMPT NOT IN SAFETY
✖	A3	FFE AIMPT NOT IN SAFETY
✖	A4	FFE NO SOLUTION

III

Msn Solution
✖ AB0001
✖ Menu

- a. The **Type** shows the type of error or warning (e.g., X means error, ! means warning).
- b. The **Gun** shows which gun had the error or warning.
- c. The **Description** gives a brief description of the error or warning.

**Msn Solution** - Displays the Solution/Gun Orders screen.

## Solution/Gun Orders Screen

The Solution/Gun Orders screen is automatically displayed if there are no errors or warnings in the mission data. The screen provides the means to review the gun orders.

Solution / Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev
A1	FFE	DNL	2817	3		1148
A2	FFE	DNL	2817	3		1148
A2	ADJ	WR	2817	3		1148
A3	FFE	DNL	2817	3		1148
A4	FFE	DNL	2817	3		1148

Errors/Warnings	Shot
AB0001	

Solution / Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev
A1	FFE	DNL	2817	3		1148
A2	FFE	DNL	2817	3		1148
A2	ADJ	WR	2817	3		1148
A3	FFE	DNL	2817	3		1148
A4	FFE	DNL	2817	3		1148

Gun: A2 Defl: 2817  
 MOF: ADJ Charge: 3  
 MOC: WR Elev: 1148  
 Lot: A FS:  
 TOF: 42 Aim Az: 2746  
 Range: 3587

- a. The **Gun** shows the guns being used in the mission.
- b. The **MOF** can be **ADJ**, **CONT**, **FFE**, or **RFFE**.
- c. The **MOC** can be **AMC**, **DNL**, **FFE**, or **WR**.
- d. The **Defl** is the deflection of the round to the target.
- e. The **Ch** is the amount of charges to be fired.
- f. The **FS** is the fuze setting. The column is blank unless the mission is an illumination.
- g. The **Elev** is the elevation of the gun, target, known point, or Forward Observer (FO).
- h. The **TOF** is the time of flight of the round.
- i. The **Lot** is the ammunition alpha identifier.
- j. The **Aim Az** is the aiming azimuth to the target.
- k. The **Range** is the range to the target.

**Errors/Warnings** - Displays the Errors and Warning screen.

**Shot** - Starts the Splash clock and keeps count of the fired round(s) for the Ammunition List. This step is completed later in this WP.



**MANUAL GRID MISSION - Continued****Solution/Gun Orders Screen - Continued**

1. Verify and record the following data:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2817	3		1148	42	A	2746	3587
A2	FFE	DNL	2817	3		1148	42	A	2746	3587
A2	ADJ	WR	2817	3		1148	42	A	2746	3587
A3	FFE	DNL	2817	3		1148	42	A	2746	3587
A4	FFE	DNL	2817	3		1148	42	A	2746	3587

2. Click the target number (e.g., AB0001) to display the Target screen.

**Mission Log Screen**

The Mission Log screen provides the means to review the original mission and each adjustment made to the mission. The most recent adjustment is display at the top of the log.

1. From the Target screen, click **Mission Log** to display the Mission Log screen.

Mission Log

1324.00 02Sep2005	
THIS IS FDC	
ADJUST FIRE	
03110 90199 0110 16 NORTH WE	
(I) GUNS AVAIL 4	
(I) NEAREST GUN A1 RNG 3585 AOF 2	

2. Verify the information in the mission log.
3. Click the target number to return to the Target screen.

## Gun Select Screen

The Gun Select screen provides the means to verify or edit the guns selected for a mission (**Sel/Gun**), to verify their operational status (**Status**), and to verify the mission number (**Msn**) or FPF number (**FPF**).

- From the Target screen, click **Gun Select**. The Gun Select screen is displayed.

Gun Select

Sel	Gun	Status	Msn	FPF
<input checked="" type="checkbox"/>	A1	OPRDY	AB0001	
<input checked="" type="checkbox"/>	A2	OPRDY	AB0001	
<input checked="" type="checkbox"/>	A3	OPRDY	AB0001	
<input checked="" type="checkbox"/>	A4	OPRDY	AB0001	

AB0001

Select All  
 Deselect All  
 Use All

- The **Sel/Gun** shows what guns are selected for a mission. At any time during a mission the guns can be selected or deselected and the LHMBBC software will recalculate the solution.
- The **Status** shows the status of each gun (**OPRDY** or **OPOUT**).
- The **Msn** shows the mission number.
- The **FPF** shows the FPF mission number if the mission is an FPF.

**Select All** - Selects (checks) all the guns in the Gun Select list for a mission.

**Deselect All** - Deselects (unchecks) all the guns on the Gun Select list.

- Verify all the guns are selected and in **OPRDY** status.
- Click **Use All** to save any changed data and to continue the mission.

## MANUAL GRID MISSION - Continued

### Safety Data Screen

The Safety Data screen provides the means to review and verify the safety data for each gun in the mission.

- From the Target screen, click **Safety Data** to display the Safety Data screen.

Safety Data

Gun	MOC	Rng	Azim	MaxOrd	Ai
A1	DNL	3587	2743	2315	2
A2	DNL	3587	2743	2315	2
A2	WR	3587	2743	2315	2
A3	DNL	3587	2743	2315	2

AB0001

Safety Data

Gun	MOC	Rng	Azim	MaxOrd	Ai
A1	DNL	3587	2743	2315	2
A2	DNL	3587	2743	2315	2
A2	WR	3587	2743	2315	2
A3	DNL	3587	2743	2315	2

Gun: A2    MOC: WR    Rng: 3587  
 MaxOrd: 2315m/7596ft  
 AimPtAz: 2746    Azim: 2743  
 HtBrst:    GridDecl: -20.5  
 BurnTime:  
 CnEst:    CnNrt:

<b>Aim Point</b>					
03110	90199	0110	16	N	WE

- The **Gun** shows the guns being used in the mission.
- The **MOC** can be **AMC**, **DNL**, **FFE**, or **WR**.
- The **Rng** is the range to the target.
- The **Azim** is the azimuth to the target.
- The **MaxOrd** is the height of the round at its summit.
- The **AimPtAzim** is the accrual azimuth the round followed to hit the target.
- The **AimPoint** is the aiming grid coordinates to the target.
- The **BurstHt** is the round busted.
- The **BurnTime** is the amount of time the round will burn before burning out.
- The **CanisterEasting** is blank unless the mission is an illumination. It is the easting to where the canister should impact if the round malfunctions.
- The **CanisterNorthing** is blank unless the mission is an illumination. It is the northing to where the canister should impact if the round malfunctions.
- The **GridDecl** is the grid declination constant to compensate for inaccuracies in the process of converting magnetic azimuths to grid azimuths.

- Verify and record the safety data.

- From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**. The target number and splash countdown (**AB0001 - #**) is displayed on the top left banner. When the countdown is complete, **SPLSH** is displayed for a few seconds and then disappears.

### Subsequent Adjust (Adjust Fire)

*FO calls: Left 100, Drop 100*

## NOTE

Use GTL for this subsequent adjust.

The Subsequent Adjust screen provides the means to make gun adjustments.

- From the Target screen, click **Subs Adjust** to display the Subsequent Adjust screen.

Subsequent Adjust

MOF  MOC

GTL ☒

GTLAzim

Meters

☒ Left ☐ Right

☐ Add ☒ Drop

☐ Up ☐ Down

- The **MOF** can be **ADJ**, **CONT**, **FFE**, or **RFFE**.
  - The **MOC** can be **AMC**, **DNL**, or **WR**.
  - If the **GTL** is checked, the **GTLAzim** (gun target line azimuth) is automatically entered, but can be changed. If the **GTL** is not checked, the **OTAzim** (azimuth from the observer to the target) can be entered. The **Angle T** (angler difference in mils between the observer target line and gun target line) is read-only and is only available if there is an observer target azimuth.
  - Gun adjustments are entered in meters for **Right/Left**, **Add/Drop**, and **Up/Down**.
- Enter the adjustments as shown and click **Use All**.
  - When an adjustment is processed, the Solution/Gun Orders screen is automatically displayed. Verify and record the following data:

### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2846	3		1165	42	A	2717	3487
A2	FFE	DNL	2846	3		1165	42	A	2717	3487
A2	ADJ	WR	2846	3		1165	42	A	2717	3487
A3	FFE	DNL	2846	3		1165	42	A	2717	3487
A4	FFE	DNL	2846	3		1165	42	A	2717	3487

- Call out the firing data to the guns and click **Shot**.

**MANUAL GRID MISSION - Continued****Subsequent Adjust (Fire For Effect)**

*FO calls: Add 50, FFE*

**NOTE**

Continue using GTL for this subsequent adjust.

1. From the Target screen, click **Subs Adjust** to display the Subsequent Adjust screen.
2. Enter the adjustments (change **MOF** to **FFE** and enter **Add 50 Meters**) and click **Use All**.
3. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	2846	3		1157	42	A	2717	3535
A2	FFE	WR	2846	3		1157	42	A	2717	3537
A3	FFE	WR	2846	3		1157	42	A	2717	3535
A4	FFE	WR	2846	3		1157	42	A	2717	3535

4. From the Safety Data screen, verify and record the following data. Record the burst point grid and altitude on DA Form 2399-R (Computer's Record) located at the back of this manual.

**Safety Data**

Gun	MOC	Rng	Azim	MaxOrd	AimPtAzim	Aim Point	GridDecl
A1	WR	3535	2714	2331	2717	03215 90305 0110 16 N WE	-20.5
A2	WR	3537	2714	2331	2717	03179 90289 0110 16 N WE	-20.5
A3	WR	3535	2714	2331	2717	03141 90274 0110 16 N WE	-20.5
A4	WR	3535	2714	2331	2717	03104 90259 0110 16 N WE	-20.5

5. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

## End of Mission (EOM)

*FO calls: End mission, three trucks destroyed, assign known point*

The End of Mission (EOM) screen provides the means to end a mission.

1. From the Target screen, click **EOM**. The End of Mission (EOM) screen is displayed.

End of Mission (EOM)

**End Mission Action**

☐ EOM - No Save  
☐ EOM - Record as Target  
☒ EOM - Record as Known Point  
☐ DELETE - FPF

Controlling FO <Select FO>  
 <Select FO>  
 FO

AB0001 Use All

**EOM - No Save** - Ends the mission without saving the mission data.

**EOM - Record as Target** - Saves the target number used to fire the mission data.

**EOM - Record as Known Point** - Saves a verifiable point on the map and can be used by other units. A **Controlling FO** must be selected.

**DELETE - FPF** - Deletes any stored or fired FPF mission. It is only enabled if the mission is an FPF.

2. Select **EOM - Record as Known Point** (**EOM - No Save** is selected by default) and select **FO** for the **Controlling FO**.
3. Click **Use All**. The Select Known Point Number screen is displayed. **(In Use)** is displayed next to a known point that has been previously recorded. If selected, the control button for **Save As KP#** (# represents number selected) changes to **Overwrite KP#**. If clicked, the previously saved known point is overwritten with the newly recorded known point.

Select Known Point Number

For FO FO

Known Point 01

Discard Save As KP01

**Discard** - Displays the Status screen without recording a known point.

4. Select **01** for the **Known Point** and click **Save As KP01**.

## MANUAL GRID MISSION - Continued

### Ammunition Expended Screen

The Ammunition Expended screen provides to means to view or edit the rounds that are expended for a mission.

Ammunition Expended

Unit	Lot	Rounds
A1	A	3
A2	A	5
A3	A	3
A4	A	3

+  
-

Is this ammunition expenditure report correct? Use +/- buttons to adjust number of rounds.

Cancel      Use All

- a. Each **Unit** used in the mission is listed.
- b. The **Lot** shows the ammunition alpha identifier.
- c. The **Rounds** shows the number of rounds expended after firing.

**Cancel** - The information message “Ammo expended for mission must be adjusted manually in inventory” is displayed. The operator will have to manually update the rounds from the Ammunition screen.

1. If necessary, change the amount of rounds by clicking on the unit to be changed and clicking + or -.
2. Click **Use All** to save the data.

### Ammunition

By clicking **Shot** on the Solution/Gun Orders screen, the LHMBC automatically updates the quantity of rounds.

Status  
External Power: YES

Gun	Status	Msn	FPF	HE	WP	ILL
A1	OPRDY			97	200	100
A2	OPRDY			95	200	100
A3	OPRDY			97	200	100
A4	OPRDY			97	200	100

Ammunition

Unit	Lot	Shell-Fuze	Qu
A1	A	HE M821A2 - M734A1	97
A1	B	IL M853A1 - M772	100
A1	C	WP M375A3 - M524	200
A2	A	HE M821A2 - M734A1	95
A2	B	IL M853A1 - M772	100
A2	C	WP M375A3 - M524	200
A3	A	HE M821A2 - M734A1	97
A3	B	IL M853A1 - M772	100

## MANUAL SHIFT MISSION

The following is an example of a manual shift mission for Fire For Effect.

### NOTE

Prior to running this mission, enter only geo ref, setup data, devices, and ammo.

*FO calls: FFE, Shift from KP01  
OT Dir 2160  
Left 800, Add 400  
Trucks in wood line  
Use HED in FFE*

The Shift Mission screen provides the means to start a mission using an observer, known point, and shift coordinates. An observer and known point must have been previously recorded.

1. Click **Menu/Manual Missions/Shift Msn** to display the Shift Mission screen.

Shift Mission

Mission Type HE FFE

Obs FO KnPt 01

**Known Point Position**

03179	90289	0110	16	N	WE
-------	-------	------	----	---	----

Meters 800 ☒ Left ☐ Right

Meters 400 ☒ Add ☐ Drop

Meters  ☐ Up ☐ Down

OT Azim 2160

Cancel
Use All

- a. The **Mission Type** can be **HE ADJ**, **HE FFE**, **ILL ADJ**, **ILL FFE**, or **FPF**.
  - b. The **Obs** and **Kn Pt** must be selected. Once the known point is selected, the **Known Point Position** is displayed read-only.
  - c. The **Left/Right Meters** is optional. If entered, it must be within the range of 0 to 9999.
  - d. The **Add/Drop Meters** is optional. If entered, it must be within the range of 0 to 9999.
  - e. The **Up/Down Meters** is optional. If entered, it must be within the range of 0 to 9999.
  - f. The **OTAzim** is the azimuth from the observer to the target.
2. Enter the data as shown and click **Use All**.
  3. Verify or change the data on the Mission Data screen (the **Adj Gun** needs to be changed **A2** and the **FFE Fuze** needs to be changed to **DLY**) and click **Use All**.
  4. Verify and record the following data on the Solution/Gun Orders screen:

### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	3103	3		1150	42	A	2460	3576
A2	FFE	WR	3103	3		1150	42	A	2460	3576
A3	FFE	WR	3103	3		1150	42	A	2460	3576
A4	FFE	WR	3103	3		1150	42	A	2460	3576



## MANUAL SHIFT MISSION - Continued

- From the Safety Data screen, verify and record the following data. Record the burst point grid and altitude on DA Form 2399-R.

### Safety Data

Gun	MOC	Rng	Azim	MaxOrd	AimPtAzim	Aim Point	GridDecl
A1	WR	3576	2457	2319	2460	03975 90777 0110 16 N WE	-20.5
A2	WR	3576	2457	2319	2460	03938 90762 0110 16 N WE	-20.5
A3	WR	3576	2457	2319	2460	03901 90745 0110 16 N WE	-20.5
A4	WR	3576	2457	2319	2460	03864 90731 0110 16 N WE	-20.5

- From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: End mission, truck burning, assign target*

- From the End of Mission (EOM) screen, select **EOM - Record as Target** and click **Use All**.
- If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

## MANUAL POLAR MISSION

The following is an example of a manual polar mission with a subsequent adjustment for Adjust Fire and Fire For Effect.

### NOTE

Prior to running this mission, enter only geo ref, setup data, devices, and ammo.

*FO calls: Adjust Fire, Polar  
OT Dir 1800  
Distance 3500  
Infantry company in open  
Use PROX in FFE*

The Polar Mission screen provides the means to start a mission using an observer and polar coordinates. An observer and the observer's position must have been previously recorded.

- Click **Menu/Manual Missions/Polar Msn** to display the Polar Mission screen.

The screenshot shows the 'Polar Mission' screen with the following fields and controls:

- Mission Type:** A dropdown menu currently set to 'HE ADJ'.
- Observer:** A dropdown menu currently set to 'FO'.
- Coordinates:** A display showing '00905 92350 0175 16 N WE'.
- Direction:** A text input field containing '1800' with the unit 'Mils' to its right.
- Distance:** A text input field containing '3500' with the unit 'Meters' to its right.
- VI:** A text input field followed by two radio buttons labeled 'Up' and 'Down'.
- Buttons:** At the bottom, there are two buttons: 'Cancel' and 'Use All'.

- The **Mission Type** can be **HE ADJ**, **HE FFE**, **ILL ADJ**, **ILL FFE**, **SUPPRESS**, **IM SMOKE**, or **FPF**.
- The **Observer** must be selected. Once the observer is selected, the observer's position is displayed and is read-only.

- c. The **Direction Mils** must be within the range of 0 to 6399 between the FO and the target line.
- d. The **Distance Meters** must be within the range of 0 to 9999 along the FO-target line.
- e. The **VI** (Vertical Interval) is the expression of change in elevation between the target and the gun altitude in meters or the FO and the target altitude in meters. It is optional (if known). If entered, it must be within the range of 0 and 9999 between the FO and the desired target.

2. Enter the data as shown and click **Use All**.

3. Verify or change the data on the Mission Data screen (the **Adj Gun** needs to be changed **A2** and the **FFE Fuze** needs to be changed to **PRX**) and click **Use All**.

4. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	3385	3		1193	42	A	2178	3295
A2	FFE	DNL	3385	3		1193	42	A	2178	3290
A2	ADJ	WR	3385	3		1193	42	A	2178	3290
A3	FFE	DNL	3385	3		1193	42	A	2178	3295
A4	FFE	DNL	3385	3		1193	42	A	2178	3295

5. From the Safety Data screen, verify and record the safety data for the active gun.

6. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Right 100, Add 100*

7. From the Subsequent Adjust screen, enter the adjustments (enter **Right 100 Meters** and **Add 100 Meters**) and click **Use All**.

8. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	3368	3		1171	42	A	2195	3426
A2	FFE	DNL	3368	3		1171	42	A	2195	3420
A2	ADJ	WR	3368	3		1171	42	A	2195	3420
A3	FFE	DNL	3368	3		1171	42	A	2195	3426
A4	FFE	DNL	3368	3		1171	42	A	2195	3426

9. From the Safety Data screen, verify and record the safety data for the active gun.

10. Call out the firing data to the guns and click **Shot**.

*FO calls: Drop 50, FFE*

11. From the Subsequent Adjust screen, enter the adjustments (change **MOF** to **FFE** and enter **Drop 50 Meters**) and click **Use All**.

**MANUAL POLAR MISSION - Continued**

12. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	3362	3		1179	42	A	2201	3379
A2	FFE	WR	3362	3		1179	42	A	2201	3374
A3	FFE	WR	3362	3		1179	42	A	2201	3379
A4	FFE	WR	3362	3		1179	42	A	2201	3379

13. From the Safety Data screen, verify and record the following data. Record the burst point grid and altitude on DA Form 2399-R.

**Safety Data**

Gun	MOC	Rng	Azim	MaxOrd	AimPtAzim	Aim Point	GridDecl
A1	WR	3379	2198	2374	2201	04409 91571 0175 16 N WE	-20.5
A2	WR	3374	2198	2374	2201	04367 91559 0175 16 N WE	-20.5
A3	WR	3379	2198	2374	2201	04335 91540 0175 16 N WE	-20.5
A4	WR	3379	2198	2374	2201	04298 91525 0175 16 N WE	-20.5

14. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Replot, Altitude 200*

15. Click **RePlot** from the Target screen to display the Mission RePlot screen.

Mission RePlot

**Mission Aimpoint**  
 04367 91559 0175 16 N WE

Gun Select A2 ▼

Desired Altitude 200

16. Enter the data as shown and click **Use All**.

17. Click **Yes** to confirm new mission aimpoint (04365 91560 0200 16 N WE).

*FO calls: End mission, est 80% CAS, assign target*

18. From the End of Mission (EOM) screen, select **EOM - Record as Target** and click **Use All**.

19. If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

## MANUAL QUICK FIRE MISSION

The following is an example of a manual quick fire mission for Fire For Effect.

### NOTE

Prior to running this mission, enter only geo ref, setup data, devices, and ammo.

*FO calls: FFE, Quick Fire  
AB0002  
Troops in wood line  
Use HED in FFE*

The Quick Fire Mission screen provides the means to start a mission using a previously recorded target.

1. Click **Menu/Manual Missions/Quick Fire Msn** to display the Quick Fire Mission screen.

Quick Fire Mission

Mission Type

Target

**Target Position**

03938	90762	0110	16	N	WE
-------	-------	------	----	---	----

- a. The **Mission Type** can be **HE FFE**, **ILL FFE**, **SUPPRESS**, **IM SMOKE**, or **FPF**.
  - b. A **Target** must be selected. Once the target is selected, the **Target Position** is displayed read-only.
  - c. The **Left/Right Meters** is optional. If entered, it must be within the range of 0 to 9999.
  - d. The **Add/Drop Meters** is optional. If entered, it must be within the range of 0 to 9999.
  - e. The **Up/Down Meters** is optional. If entered, it must be within the range of 0 to 9999.
  - f. The **OTAzim** is the azimuth from the observer to the target.
2. Enter the data as shown and click **Use All**.
  3. Verify or change the data on the Mission Data screen (the **Adj Gun** needs to be changed to **A2** and the **FFE Fuze** needs to be changed to **DLY**) and click **Use All**.
  4. Verify and record the following data on the Solution/Gun Orders screen:

### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	3103	3		1150	42	A	2460	3576
A2	FFE	WR	3103	3		1150	42	A	2460	3576
A3	FFE	WR	3103	3		1150	42	A	2460	3576
A4	FFE	WR	3103	3		1150	42	A	2460	3576

## MANUAL QUICK FIRE MISSION - Continued

- From the Safety Data screen, verify and record the following data:

**Safety Data**

Gun	MOC	Rng	Azim	MaxOrd	AimPtAzim	Aim Point	GridDecl
A1	WR	3576	2457	2319	2460	03975 90777 0110 16 N WE	-20.5
A2	WR	3576	2457	2319	2460	03938 90762 0110 16 N WE	-20.5
A3	WR	3576	2457	2319	2460	03901 90745 0110 16 N WE	-20.5
A4	WR	3576	2457	2319	2460	03864 90731 0110 16 N WE	-20.5

- From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: End mission, est 80% CAS, do not save*

- From the End of Mission (EOM) screen, and click **Use All** (EOM - No Save is selected by default).
- If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

## MANUAL DIRECT LAY MISSION

The Direct Lay screen provides a means of firing on a visible target. In a Direct Lay Mission, positions and azimuth are not needed since the weapon is manually aimed at a visible target. Direct Lay Missions do not update the ammunition inventory.

### NOTE

The Direct Lay feature may fail to return the elevation and charge information and instead indicate that the aim-point is not in the safety fan. If a safety fan was entered, the safety fan needs to be deleted and the software restarted to avoid this error.

3200 mils should be entered on the sight.

- Click **Menu/Manual Missions/Direct Lay** to display the Direct Lay Mission screen.

Direct Lay

Range: 3500

VI: 50 ☒ Up ☐ Down

Weapon: M252 - GROUND

Shell: HE M821A2 - M734A1

Fuze: DLY

Calculate Adj  ☐ Add ☐ Drop

Charge: 3

Elev: 1154

FS:

TOF: 41

WARNING: No Ammo Expenditure Report

- The **Range** is the distance to the target in meters.
- The **VI** (Vertical Interval) is the relative altitude difference between the gun to the target in meters. It is optional.
- The **Weapon** is the weapon type that will fire the mission.
- The **Shell** is the shell type to be fired.
- The **Fuze** is the fuze setting used.
- The **Adj** (Adjust) will compute the **Range** using **Add** or **Drop**.

- Enter the data as shown and click **Calculate**. The required **Charge**, **Elev** (Elevation), **FS** (Fuze Setting) and **TOF** (Time of Flight) are displayed.
- If subsequent adjustments are needed, enter changes and recalculate.

## MANUAL HIPSHOOT MISSION

The Hipshoot screen provides a means to obtain firing data quickly when orders are received while on the move. Hipshoot Missions require positions for the gun and the target. Hipshoot Missions do not update the ammunition inventory.

### NOTE

Prior to running this mission, enter only geo ref and at time of mission enter weapon location, weapon type, target location, referred deflection, and ammo (shell and fuze) on Hipshoot screen only.

The Hipshoot mission checks to see if the aimpoint is in the safety fan and displays a warning if the aimpoint is not in the safety fan. Prior to running a Hipshoot mission, remove a safety fan if it is no longer valid (e.g., you move away from the area that the safety fan was in affect).

**FO calls:**     *Adjust Fire, Grid*  
                   *03110 90199 0110*  
                   *Troops in wood line*  
                   *Use HEQ in FFE*

- Click **Menu/Manual Missions/Hipshoot** to display the Hipshoot screen.

Hipshoot

<b>Weapon Location</b>	
01563 93435 0150 16 N WE	
<input type="button" value="Edit"/>	
<b>Target Location</b>	
03110 90199 0110 16 N WE	
<input type="button" value="Edit"/>	

Mnt  
Az    2746

Ref

Weapon

Shell

Fuze

- The **Weapon Location** is the grid position of the weapon
- The **Target Location** is the grid position of the target.
- The **Mnt Az** is the weapons mounting azimuth.
- 700**, **2800**, and **3200** are listed for **Ref**. A different **Ref** can be entered within a range of 0000 to 6399.
- The **Weapon** is the weapon type to fire.
- The **Shell** is the shell type to fire.
- The **Fuze** is the fuze type to fire.

**EOM** - Displays the Hipshoot EOM screen to end the Hipshoot mission.

**Compute** - Displays the Hipshoot Solution screen with the firing data. (**Subs Adj** is available after a computation is completed.)

- Enter the data as shown.

**MANUAL HIPSHOOT MISSION - Continued**

3. Click **Compute** to display the Hipshoot Solution screen which shows the firing data. Click **OK** to return to the Hipshoot screen.

Hipshoot Solution

Solution	
FS:	Defl: 3203
TOF: 42	Charge: 3
	Elev: 1148

Safety	
MaxOrd: 2314	Rng: 3586
AimAz: 2746	Azim: 2743
	GridDecl: -20
BrnTm:	HtBrst:

OK

4. If necessary, click **Subs Adj** to enter a correction and click **Compute**.

*FO calls: End mission, est 80% CAS, do not save*

5. From the Hipshoot screen, click **EOM** to display the Hipshoot EOM screen.

Hipshoot EOM

KnPt	01(In Use) ▼
Obs	<Select FO> ▼
Overwrite KP01	

AB0004
Save Target

Cancel	EOM- No Save
--------	--------------

WARNING: No Ammo Expenditure Report

**Save As KP#/Overwrite KP#** - Ends the mission and saves a known point or overwrites a previously saved known point. A **KnPt** and an **Obs** must be selected. This option is not available unless an observer was entered on the Unit List since a known point requires an FO.

**Save Target** - Ends the mission and saves the target. A target number must be selected.

**EOM - No Save** - Ends the mission with out saving the mission.

6. Click **EOM - No Save**.

**END OF WORK PACKAGE**

## OPERATOR MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

MANUAL REGISTRATION MISSION  
OPERATION UNDER USUAL CONDITIONS

## INITIAL SETUP:

## References

DA Form 2399-R  
WP 0006 00  
WP 0022 00

## Equipment Conditions

Basic Mission Setup, WP 0021 00

## GENERAL

This work package provides the procedures for conducting a manual registration mission. It also provides the procedures for storing registration points (RP) and for viewing, entering, or updating registration data.

## NOTE

For detailed information about the mission screens in this WP, see WP 0022 00 ("Manual Basic Fire Missions").

## MANUAL REGISTRATION MISSION

The following is an example of a manual registration grid mission with a subsequent adjustment for Adjust Fire and Fire For Effect.

## NOTE

Prior to running this mission, enter geo ref, setup data, devices, ammo, MET, and safety fan.

*FO calls:   Reg Point 01  
              OT Direction 2321  
              02819 90711 120  
              Use HEQ in ADJ*

1. Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	REGISTRATION ▼
Easting	02819
Northing	90711
Altitude	120
Zone	16
Datum	WE ▼
Obs Tgt Azim	

2. Enter the data as shown and click **Use All**.
3. Verify or change the data on the Mission Data screen (the **Adj Gun** needs to be changed to **A2**). Click **Use All**.



**MANUAL REGISTRATION MISSION - Continued**

4. Verify and record the following data for gun A2 on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2808	2		1013	32	A	2760	3000

5. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Right 200, Add 200*

6. Enter the adjustments on the Subsequent Adjust screen (deselect **GTL** and enter **OTAzim 2321**, **Right 200 Meters**, and **Add 200 Meters**). Click **Use All**.

7. Verify and record the following data for gun A2 on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2776	3		1190	42	A	2791	3266

8. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Left 100, Drop 100*

9. Enter the adjustments on the Subsequent Adjust screen (enter **Left 100 Meters** and **Drop 100 Meters**). Click **Use All**.

10. Verify and record the following data for gun A2 on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2790	3		1211	43	A	2776	3133

11. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Drop 50*

12. Enter the adjustments on the Subsequent Adjust screen (enter **Drop 50 Meters**). Click **Use All**.

13. Verify and record the following data for gun A2 on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2783	3		1218	43	A	2783	3087

14. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Add 25, Registration complete*

15. Enter the adjustments on the Subsequent Adjust screen (change **MOF** to **FFE** and enter **Add 25 Meters**) and click **Use All**.

16. Verify and record the following data on the Solution/Gun Orders screen:

Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	2787	3		1214	43	A	2779	3111
A2	FFE	WR	2787	3		1214	43	A	2779	3109
A3	FFE	WR	2787	3		1214	43	A	2779	3111
A4	FFE	WR	2787	3		1214	43	A	2779	3111

17. Call out the firing data to the guns and click **Shot**.

*FO calls: #1 Gun Left 10, #3 Gun Right 10, #4 Gun Right 20*

18. From the Target screen, click **Adj Sheaf** to display the Adjust Sheaf screen. **Adj Sheaf** is only enabled when the MOF is FFE.

Adjust Sheaf

Gun	AdjEasting	AdjNorthing
A1	0	0
A2	0	0
A3	0	0
A4	0	0

Zero Adj

Apply Adj

Meters

☐ Left ☐ Right ☐ GTL ☐ OBS Azim  
 ☐ Add ☐ Drop

- a. Gun adjustments (easting and northing) are entered in meters for **Left/Right** or **Add/Drop**.
- b. If the **GTL** is checked, the **GTLAzim** (gun target line azimuth) is automatically entered, but can be changed. If the **GTL** is not checked, the **OTAzim** (azimuth from the observer to the target) can be entered.

**Zero Adj** - Zeros out (deletes) entered adjustments for a selected gun.

**Apply Adj** - Applies adjustments to selected gun.

19. Enter the adjustments by entering the data (**Left 10** for Gun A1, **Right 10** for Gun A3, and **Right 20** for Gun A4) and clicking **Apply Adj** after each adjustment. Click **Use All**.

Adjust Sheaf

Gun	AdjEasting	AdjNorthing
A1	7	8
A2	0	0
A3	-7	-8
A4	-13	-15

Zero Adj

Apply Adj

Meters

☐ Left ☒ Right ☐ GTL ☐ OBS Azim  
 ☐ Add ☐ Drop

**MANUAL REGISTRATION MISSION - Continued**

20. Verify the data on the Mission Data screen and click **Use All**.
21. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	2790	3		1215	43	A	2776	3107
A2	FFE	WR	2787	3		1214	43	A	2779	3109
A3	FFE	WR	2784	3		1213	43	A	2782	3116
A4	FFE	WR	2781	3		1213	43	A	2785	3120

22. Call out the firing data to the guns and click **Shot**.

*FO calls: End mission, assign known point*

23. From the End of Mission (EOM) screen, select **EOM - Record as Known Point** and select **FO** for the **Controlling FO**. Click **Use All**.
24. The Save Registration Point screen is displayed with the registration point as read-only. **(In Use)** is displayed next to a registration point that has been previously recorded. If selected, the control button for **Save As RP#** (# represents number selected) changes to **Overwrite RP#**. If clicked, the previously saved registration point is overwritten with the newly recorded known point.
25. Select **01** for the **To RP Num** and click **Save As RP01**.
26. From the Select Known Point Number screen, select **02** for the Known Point and click **Save As KP02**.
27. Record **RP01 A2 RnCF:+037 AzCF:+019** on DA Form 2399-R.
28. If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

**REGISTRATION**

Registration provides the means to verify, add, or delete Registration Points (RP). Up to sixteen RP can be stored.

**Registration Points Screen**

The Registration Points screen is displayed by clicking **Menu/Points/Registration**.

Registration Points

RP Num	Gun	Lot	RnCF	AzCF	Recei
1	A2	A	37	19	1513
<div> <div>◀</div> <div>  </div> <div>▶</div> </div>					

Delete

Add New

## Add New Registration Screen

### NOTE

The Add New Registration screen is used if the computer or operator did not save the Registration mission and the data needs to be inputed.

The Add New Registration screen is displayed by clicking **Add New**.

Add New Registration

RP	<Select an RP> ▼		
Gun	<Select a Gun> ▼	RnCF	<input type="text"/>
Lot	<input type="text"/>	AzCF	<input type="text"/>
<b>Registration Point</b>			
			<input type="button" value="Edit"/>
<b>Firing Point</b>			
			<input type="button" value="Edit"/>

- a. An **RP** must be selected.
- b. A **Gun** must be selected.
- c. The **Lot** is not enabled until a **Gun** is selected.
- d. The **RnCF** must be within the range of -999 to 999.
- e. The **AzCF** must be within the range of 0 to 3199.
- f. The **Registration Point** and **Firing Point** are entered by clicking **Edit**. (See WP 0006 00 for information about entering the positions).

## END OF WORK PACKAGE

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**MANUAL QUICK SMOKE MISSION**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:****References**

DA Form 2399-R  
WP 0022 00

**Equipment Conditions**

Basic Mission Setup, WP 0021 00

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**GENERAL**

This work package provides the procedures for conducting a manual quick smoke mission.

**NOTE**

For detailed information about the mission screens in this WP, see WP 0022 00 (“Manual Basic Fire Missions”).

**MANUAL QUICK SMOKE MISSION**

The following is an example of a manual quick smoke mission.

**NOTE**

Prior to running this mission, enter geo ref, setup data, devices, ammo, MET, safety fan, and Registration Point.

*FO calls:   Ajust Fire, Grid  
              03000 90100 150  
              Screen wood line  
              OT Direction 2400 Length 300 x 40, Attitude 500, Duration 2 minutes  
              Use HEQ in Adj, WP in FFE  
              Fire When Ready*

**NOTE**

If applicable, use upwind flank gun.

1. Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	HE ADJ ▼
Easting	03000
Northing	90100
Altitude	150
Zone	16
Datum	WE ▼
Obs Tgt Azim	

2. Enter the data as shown and click **Use All**.

**MANUAL QUICK SMOKE MISSION - Continued**

- Verify or change the data on the Mission Data screen (change **Sheaf** to **Special** with **Length 300**, **Width 40**, and **Attitude 500**, the **Adj Gun** to **A2**, the **FFE Lot-Shell** to **C-WP M375A3**). Click **Use All**.
- Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2770	4		1131	43	C	2777	3574
A2	FFE	DNL	2768	4		1124	42	C	2779	3613
A2	ADJ	WR	2761	3		1098	41	A	2786	3632
A3	FFE	DNL	2766	4		1116	42	C	2781	3649
A4	FFE	DNL	2764	4		1109	42	C	2783	3688

- From the Safety Data screen, verify and record the safety data.
- From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

**FO calls:** *Repeat WP*

**NOTE**

The target area was hit with the HE and will be confirmed with the WP.

- Enter the adjustments on the Subsequent Adjust screen (change the **MOF** to **FFE**). Click **Use All**.
- Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	2770	4		1131	43	C	2777	3574
A2	FFE	WR	2768	4		1124	42	C	2779	3613
A3	FFE	WR	2766	4		1116	42	C	2781	3649
A4	FFE	WR	2764	4		1109	42	C	2783	3688

- Call out the firing data to the guns and click **Shot**.

**FO calls:** *WP hit desired location FFE*

- From the Target screen, click **Smoke Card** to display the Smoke Card screen.

Smoke Card

Cartridge	Humidity	Temp Grad	W Speed
M819 ▾	30 ▾	LAPSE ▾	0-2 ▾
Winds	Impact	Length	Mins
FLANK ▾	LAND ▾	500	2

Establishment: 12      **Calculate Rounds**  
Maintenance: 12      Secs between  
Total Needed: 24      Estab rounds: 5  
Rounds Avail: 0      Secs between  
Avail Length: 0      Maint rounds: 10

- a. The **Cartridge** can be **M819** or **M929**.
  - b. The **Humidity** is the amount of relative humidity in the target area.
  - c. The **Temp Grad** (Temperature Gradient) measures how the air temperature changes with the altitude. The selection is **LAPSE** (evening), **NEUTRAL** (midday), or **INVERSION** (early morning).
  - d. The **W Speed** is the wind speed measured in knots.
  - e. The **Winds** is the direction the wind is blowing on the target. The selection is **FLANK**, **QUARTERING**, **TAIL**, or **HEAD**.
  - f. The **Impact** is the type of surface the rounds will impact. The selection is **LAND** or **WATER**.
  - g. The **Length** is the total length of the target in meters.
  - h. The **Mins** is the total number of minutes the target needs to be screens.
11. Click **Calculate Rounds** to calculate the number of rounds based on the entered data.
- FO calls: End mission, target screened no save*
12. From the End of Mission (EOM) screen, click **Use All** (**EOM - No Save** is selected by default).
13. If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

## END OF WORK PACKAGE





## OPERATOR MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

MANUAL FINAL PROTECTIVE FIRE (FPF) MISSION  
OPERATION UNDER USUAL CONDITIONS

## INITIAL SETUP:

## References

DA Form 2399-R  
WP 0022 00

## Equipment Conditions

Basic Mission Setup, WP 0021 00

## GENERAL

This work package provides the procedures for conducting a manual FPF mission.

## NOTE

For detailed information about the mission screens in this WP, see WP 0022 00 ("Manual Basic Fire Missions").

## MANUAL FPF MISSION

The following is an example of a manual FPF grid mission with a subsequent adjustment for Fire For Effect.

## NOTE

Prior to running this mission, enter geo ref, setup data, devices, ammo, MET, safety fan, and Registration Point.

*FO calls:   Adjust Fire, Grid  
              02850 90875 150  
              FPF 150 x 50, Attitude 900  
              OT Dir 2400  
              Use HED in Adj (Danger Close), HEQ in FFE*

1. Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	<input type="text" value="FPF"/>
Easting	<input type="text" value="02850"/>
Northing	<input type="text" value="90875"/>
Altitude	<input type="text" value="150"/>
Zone	<input type="text" value="16"/>
Datum	<input type="text" value="WE"/>
Obs Tgt Azim	<input type="text"/>

2. Enter the data as shown and click **Use All**.
3. Verify or change the data on the Mission Data screen (enter **Length 150, Width 50, Attitude 900**, change **Adj Gun** to **A2**, change **FFE Volleys** to **10**, and ensure **Use Reg Correction** is checked). Click **Use All**.

**MANUAL PPF MISSION - Continued**

4. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2829	2		1024	32	A	2720	2850
A2	FFE	AMC	2830	2		1020	32	A	2719	2861
A2	ADJ	AMC	2830	2		1020	32	A	2719	2861
A3	FFE	DNL	2831	2		1016	32	A	2717	2871
A4	FFE	DNL	2832	2		1012	32	A	2716	2883

5. From the Safety Data screen, verify and record the safety data.
6. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

**NOTE**

FO determines the #4 gun as danger close gun.

7. From the Target screen, click **Mission Data** to display the Mission Data screen. Change **Adj Gun** to **A4** and click **Use All**.

*FO calls: Right 100, Drop 25*

8. Enter the adjustments on the Subsequent Adjust screen (deselect **GTL**, enter **OTAzim 2400**, click **Calc** for **Angle T**, and enter **Right 100 Meters** and **Drop 25 Meters**). Click **Use All**.
9. Verify and record the data on the Solution/Gun Orders screen.

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2792	2		1021	32	A	2757	2859
A2	FFE	DNL	2793	2		1017	32	A	2755	2869
A3	FFE	DNL	2795	2		1013	32	A	2754	2881
A4	FFE	AMC	2797	2		1009	32	A	2752	2891
A4	ADJ	AMC	2797	2		1009	32	A	2752	2891

*FO calls: Right 100*

10. Enter the adjustments on the Subsequent Adjust screen (enter **Right 100 Meters**) and click **Use All**.
11. Verify and record the data on the Solution/Gun Orders screen.

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2759	2		1008	32	A	2790	2894
A2	FFE	DNL	2761	2		1004	32	A	2789	2904
A3	FFE	DNL	2763	2		999	32	A	2787	2916
A4	FFE	AMC	2764	2		995	32	A	2785	2926
A4	ADJ	AMC	2764	2		995	32	A	2785	2926

*FO calls: Right 50, Drop 25*

12. Enter the adjustments on the Subsequent Adjust screen (enter **Right 50 Meters** and **Drop 25 Meters**) and click **Use All**.
13. Verify and record the data on the Solution/Gun Orders screen.

#### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2740	2		1010	32	A	2810	2890
A2	FFE	DNL	2741	2		1006	32	A	2808	2900
A3	FFE	DNL	2743	2		1001	32	A	2806	2911
A4	FFE	AMC	2745	2		997	32	A	2805	2921
A4	ADJ	AMC	2745	2		997	32	A	2805	2921

14. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

### NOTE

If the FO calls subsequent adjustments for the other guns, adjust the sheaf for each gun.

15. To store the FPF mission, click **Store FPF** on the Subsequent Adjust screen (**MOF** changes to **CONT** and **MOC** to **DNL**) and then click **Use All**.
16. Verify and record the data on the Solution/Gun Orders screen.

#### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	CONT	DNL	2740	2		1010	32	A	2810	2890
A2	CONT	DNL	2741	2		1006	32	A	2808	2900
A3	CONT	DNL	2743	2		1001	32	A	2806	2911
A4	CONT	DNL	2745	2		997	32	A	2805	2921

*FO calls: Fire FPF*

17. Click **Menu / Missions/FPFs** and the target number.
18. On the Subsequent Adjust screen, change **MOF** to **FFE** and **MOC** to **WR**. Click **Use All**.

*FO calls: End mission, delete FPF*

19. From the End of Mission (EOM) screen, click **Use All** (**DELETE FPF** is selected by default).
20. If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

### END OF WORK PACKAGE

## OPERATOR MAINTENANCE

### LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

### MANUAL ILLUMINATION AND COORDINATED ILLUMINATION MISSIONS OPERATION UNDER USUAL CONDITIONS

#### INITIAL SETUP:

##### References

DA Form 2399-R  
WP 0022 00

##### Equipment Conditions

Basic Mission Setup, WP 0021 00

#### GENERAL

This work package provides the procedures for conducting manual illumination and coordinated illumination missions.

#### NOTE

For detailed information about the mission screens in this WP, see WP 0022 00 ("Manual Basic Fire Missions").

#### MANUAL ILLUMINATION MISSION

The following is an example of a manual illumination mission with a subsequent adjustments for Adjust Fire.

#### NOTE

Prior to running this mission, enter geo ref, setup data, devices, ammo, MET, safety fan, and Registration Point.

**FO calls:**    *Adjust Fire, Illumination*  
                  *03500 89850 150*  
                  *OT Dir 320*  
                  *Suspected enemy movement*

1. Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	ILL ADJ ▼
Easting	03500
Northing	89850
Altitude	150
Zone	16
Datum	WE ▼
Obs Tgt Azim	

2. Enter the data as shown and click **Use All**.
3. From the Gun Select screen, deselect guns **A2**, **A3**, and **A4** and click **Use All**.
4. From the Mission Data screen, verify or change the data (change the **Sheaf** to **1 GUN IL** and the **FFE Volleys** to **2**). Click **Use All**.

**MANUAL ILLUMINATION MISSION - Continued**

5. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2856	4	45	1122	45	B	2705	4071
A1	ADJ	WR	2856	4	45	1122	45	B	2705	4071

**NOTE**

Note the correct FS (fuze setting) is 45.2 (highlight the A1 ADJ data line with the stylus and drag the stylus to the bottom of the screen to display the firing data).

6. From the Safety Data screen, verify and record the safety data.
7. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Right 200, Drop 400, Down 100*

8. Enter the adjustments on the Subsequent Adjust screen (deselect **GTL**, enter **OTAzim 0320**, click **Calc** for **Angle T**, and enter **Right 200 Meters**, **Drop 400 Meters**, and **Down 100 Meters**). Click **Use All**.
9. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2824	4	44	1046	44	B	2739	4495
A1	ADJ	WR	2824	4	44	1046	44	B	2739	4495

**NOTE**

Note the correct FS is 43.8.

10. From the Safety Data screen, verify and record the safety data.
11. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Up 50, prepare to mark illum*

12. Enter the adjustment on the Subsequent Adjust screen (enter **Up 50 Meters**) and click **Use All**.
13. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2824	4	43	1042	43	B	2739	4495
A1	ADJ	WR	2824	4	43	1042	43	B	2739	4495

**NOTE**

Note the correct FS is 43.4.

14. From the Safety Data screen, verify and record the safety data.
15. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

**NOTE**

Mark time is 55 seconds.

## MANUAL COORDINATED ILLUMINATION MISSION

The following is an example of a manual coordinated illumination mission with a subsequent adjustments for Fire For Effect.

### NOTE

Prior to running this mission, enter geo ref, setup data, devices, ammo, MET, safety fan, and Registration Point.

At this point, the illumination gun is in the FFE and the mission is running.

**FO calls:**     *Adjust Fire, Grid*  
                   *03500 89850 150*  
                   *OT Dir 320*  
                   *Enemy vehicle*

1. Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	HE ADJ
Easting	03500
Northing	89850
Altitude	150
Zone	16
Datum	WE
Obs Tgt Azim	

2. Enter the data as shown and click **Use All**.
3. Verify or change the data on the Mission Data screen (change the **MOC** to **AMC**). Ensure **Use Reg Correction** is checked. Click **Use All**.
4. Verify and record the following data on the Solution/Gun Orders screen:

### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	FFE	DNL	2856	4		1171	48	A	2685	4085
A3	ADJ	AMC	2856	4		1171	48	A	2685	4079
A3	FFE	DNL	2856	4		1171	48	A	2685	4079
A4	FFE	DNL	2856	4		1171	48	A	2685	4085

5. From the Safety Data screen, verify and record the safety data.
6. From the Solution/Gun Orders screen, call out the firing data to the guns. Click **Shot** for the Illumination Gun (Gun #1), wait 7 seconds, and then click **Shot** for the HE Gun (Gun #3).

**FO calls:**     *Left 100, Drop 50, FFE*

7. Enter the adjustments on the Subsequent Adjust screen (change the **MOF** to **FFE**, deselect **GTL**, enter **OTAzim 0320**, click **Calc** for **Angle T**, and enter **Left 100 Meters** and **Drop 50 Meters**). Click **Use All**.

**MANUAL COORDINATED ILLUMINATION MISSION - Continued**

8. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	FFE	AMC	2834	3		996	38	A	2712	4038
A3	FFE	AMC	2834	3		996	38	A	2712	4041
A4	FFE	AMC	2834	3		996	38	A	2712	4038

9. From the Safety Data screen, verify and record the safety data.
10. From the Solution/Gun Orders screen, call out the firing data to the guns. Click **Shot** for the Illumination Gun (Gun #1), wait 7 seconds, and then click **Shot** for the HE Gun (Gun #3).

*FO calls: End mission, vehicle burning, assign target for HE guns*

11. Record burst point grid and altitude on DA 2399-R.
12. From the End of Mission (EOM) screen, select **EOM - Record as Target** and click **Use All**.
13. If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

*FO calls: End mission, do not save illumination*

14. Click **Menu / Missions/FPFs** and select the illumination target number.
15. From the End of Mission (EOM) screen, click **Use All** (**EOM - No Save** is selected by default).
16. If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

**END OF WORK PACKAGE**

**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

(NSN 7021-01-521-1611, PN 13007892)

**MANUAL SEARCH AND TRAVERSE MISSIONS  
OPERATION UNDER USUAL CONDITIONS****INITIAL SETUP:****References**DA Form 2399-R  
WP 0022 00**Equipment Conditions**

Basic Mission Setup, WP 0021 00

**GENERAL**

This work package provides the procedures for conducting manual search and traverse missions. It also provides the procedures for viewing, entering, or editing search/traverse data and for storing a search/traverse mission.

**NOTE**

The LHMBC will automatically default to the best type of mission (search, traverse, or combined search/traverse) based on the relationship of the gun line attitude, target attitude, length, and width.

For detailed information about the mission screens in this WP, see WP 0022 00 ("Manual Basic Fire Missions").

**MANUAL SEARCH MISSION**

The following is an example of a manual search mission with a subsequent adjustments for Adjust Fire and Fire For Effect.

**NOTE**

Prior to running this mission, enter geo ref, setup data, devices, ammo, MET, safety fan, and Registration Point.

**FO calls:**    *Adjust Fire, Grid*  
                  *02650 91050 150*  
                  *Stalled convoy, Length 250, Width 40, Attitude 2400*  
                  *OT Direction 2600*

1. Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	HE ADJ
Easting	02650
Northing	91050
Altitude	150
Zone	16
Datum	WE
Obs Tgt Azim	

2. Enter the data as shown and click **Use All**.



**MANUAL SEARCH MISSION - Continued**

3. From the Mission Data screen, change the **Sheaf** to **SRCH/TRAV** and click **S&T INFO**.
4. The Search/Traverse Sheaf Information screen is displayed. This screen provides the means to view, enter, or edit the search/traverse data.

<p>Search/Traverse Sheaf Information</p> <p>Orientation Method <span style="border: 1px solid black; padding: 2px;">2ND POINT ▾</span></p> <p>Adjust Point Location <span style="border: 1px solid black; padding: 2px;">CENTER ▾</span></p> <p><b>2nd Point</b> _____</p> <div style="border: 1px solid black; width: 150px; height: 30px; margin: 5px auto; text-align: center;">Edit Position</div> <p>Target Width <span style="border: 1px solid black; display: inline-block; width: 80px; height: 20px; vertical-align: middle;"></span></p>	<p>Search/Traverse Sheaf Information</p> <p>Orientation Method <span style="border: 1px solid black; padding: 2px;">ATTITUDE ▾</span></p> <p>Adjust Point Location <span style="border: 1px solid black; padding: 2px;">CENTER ▾</span></p> <p>Target Length <span style="border: 1px solid black; display: inline-block; width: 30px; height: 20px; vertical-align: middle;"></span></p> <p>Target Width <span style="border: 1px solid black; display: inline-block; width: 70px; height: 20px; vertical-align: middle;"></span></p> <p>Target Attitude <span style="border: 1px solid black; display: inline-block; width: 70px; height: 20px; vertical-align: middle;"></span></p>	<p>Search/Traverse Sheaf Information</p> <p>Orientation Method <span style="border: 1px solid black; padding: 2px;">ATTITUDE ▾</span></p> <p>Adjust Point Location <span style="border: 1px solid black; padding: 2px;">FLANK ▾</span></p> <p>Reference Direction <span style="border: 1px solid black; padding: 2px;">GUN-TGT ▾</span></p> <p>Reference Azimuth <span style="border: 1px solid black; padding: 2px;">2749</span></p> <p>Target Length <span style="border: 1px solid black; display: inline-block; width: 30px; height: 20px; vertical-align: middle;"></span> <span style="border: 1px solid black; padding: 2px;">LEFT ▾</span></p> <p>Target Width <span style="border: 1px solid black; display: inline-block; width: 70px; height: 20px; vertical-align: middle;"></span></p> <p>Target Attitude <span style="border: 1px solid black; display: inline-block; width: 70px; height: 20px; vertical-align: middle;"></span></p>
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- a. The **Orientation Method** can be **2ND POINT** or **ATTITUDE**. If **2ND POINT** is selected, a second point position and target width must be entered. If **ATTITUDE** is selected, the target's length, width, and attitude must be entered.
  - b. The **Adjust Point Location** can be **CENTER** or **FLANK**. If **FLANK** is selected, **Reference Direction** and **Reference Azimuth** must be entered.
5. Change the **Orientation Method** to **ATTITUDE** and **Adjust Point Location** to **CENTER**, and enter **Target Length 250**, **Target Width 40**, and **Target Attitude 2400**. Click **Use All**.
  6. From the Mission Data screen, change the **Adj Gun** to **A2** and click **Use All**.
  7. The Search/Traverse Operation screen is displayed. This screen provides the means to view or edit the type of mission (search, traverse, or combined).

Search/Traverse Operation	
Relative Orientation	<span style="border: 1px solid black; padding: 2px;">357</span>
Max Search Limit	<span style="border: 1px solid black; padding: 2px;">711</span>
Min Traverse Limit	<span style="border: 1px solid black; padding: 2px;">800</span>
Search/Trav Type <span style="border: 1px solid black; padding: 2px;">LINE ▾</span>	
Search/Trav Method	<span style="border: 1px solid black; padding: 2px;">SEARCH ▾</span>

- a. The **Relative Orientation**, **Max Search Limit**, and **Min Traverse Limit** are automatically entered.
  - b. The **Search/Trav Type** can be **AREA** or **LINE**.
  - c. The **Search/Trav Method** can be **COMBINED**, **SEARCH**, or **TRAVERSE**.
8. Verify the data as shown and click **Use All**.

9. Verify and record the following data on the Solution/Gun Orders screen:

Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2782	2		1082	33	A	2767	2706
A2	FFE	DNL	2789	2		1099	34	A	2760	2650
A2	ADJ	WR	2785	2		1099	34	A	2764	2621
A3	FFE	DNL	2796	2		1115	34	A	2753	2593
A4	FFE	DNL	2804	2		1131	34	A	2745	2536

10. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Left 200, Add 200*

11. Enter the adjustments on the Subsequent Adjust screen (deselect **GTL**, enter **OTAzim 2600**, click **Calc** for **Angle T**, and enter **Left 200 Meters** and **Add 200 Meters**). Click **Use All**.

12. Verify and record the following data on the Solution/Gun Orders screen:

Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2862	2		1023	32	A	2686	2881
A2	FFE	DNL	2870	2		1043	33	A	2678	2825
A2	ADJ	WR	2867	2		1043	33	A	2681	2795
A3	FFE	DNL	2879	2		1062	33	A	2669	2769
A4	FFE	DNL	2887	2		1080	33	A	2661	2715

13. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: Left 100, Drop 50, FFE*

14. Enter the adjustment on the Subsequent Adjust screen (change **MOF** to **FFE** and enter **Left 100 Meters** and **Drop 50 Meters**) and click **Use All**.

15. Verify and record the following data on the Solution/Gun Orders screen:

Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	2896	2		1044	33	A	2651	2822
A2	FFE	WR	2905	2		1062	33	A	2643	2768
A3	FFE	WR	2914	2		1080	33	A	2633	2714
A4	FFE	WR	2924	2		1096	34	A	2623	2660

## MANUAL SEARCH MISSION - Continued

- Click **Srch/Trav Data** to display the S/T Round & Hand Wheel Fire Data screen. This screen provides the means to view the requirements to complete a sheaf pattern for an FFE.

S/T Round & Hand Wheel Fire Data	
Rounds per Weapon	3
Deflection	
Turns Between Rnds	
Total Turns	
Elevation	
Turns Between Rnds	1.0
Total Turns	DOWN 2.0

- Verify and record the data as shown and click **Use All**.
- From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

**FO calls:** *End mission, do not save*

- Record burst point grid and altitude on DA 2399-R.
- From the End of Mission (EOM) screen, select **EOM - No Save** and click **Use All**.
- If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

## MANUAL TRAVERSE MISSION

The following is an example of a manual traverse mission with a subsequent adjustments for Adjust Fire and Fire For Effect.

### NOTE

Prior to running this mission, enter geo ref, setup data, devices, ammo, MET, safety fan, and Registration Point.

**FO calls:** *Adjust Fire, Grid*  
*02650 91050 150*  
*Stalled convoy, Length 250, Width 40, Attitude 0800*  
*OT Direction 2600*

- Click **Menu/Manual Missions/Grid Msn** to display the Grid Mission screen.

Grid Mission	
Mission Type	HE ADJ
Easting	02650
Northing	91050
Altitude	150
Zone	16
Datum	WE
Obs Tgt Azim	

- Enter the data as shown and click **Use All**.

3. From the Mission Data screen, change the **Sheaf** to **SRCH/TRAV** and click **S&T INFO**.

4. From the Search/Traverse Operation screen, enter the data as shown and click **Use All**.

Search/Traverse Sheaf Information

Orientation Method

Adjust Point Location

Target Length

Target Width

Target Attitude

5. From the Mission Data screen, change the **Adj Gun** to **A2** and click **Use All**.

6. From the Search/Traverse Operation screen, verify the data as shown and click **Use All**.

Search/Traverse Operation

Relative Orientation

Max Search Limit

Min Traverse Limit

Search/Trav Type

Search/Trav Method

7. Verify and record the following data on the Solution/Gun Orders screen:

#### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2792	2		1108	34	A	2757	2588
A2	FFE	DNL	2785	2		1102	34	A	2765	2610
A2	ADJ	WR	2785	2		1099	34	A	2764	2621
A3	FFE	DNL	2778	2		1095	34	A	2772	2632
A4	FFE	DNL	2771	2		1088	34	A	2778	2656

8. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

**FO calls:** Left 50, Add 25, FFE

9. Enter the adjustment on the Subsequent Adjust screen (change **MOF** to **FFE**, deselect **GTL**, enter **OTAzim 2600**, click **Calc** for **Angle T**, and enter **Left 50 Meters** and **Add 25 Meters**) and click **Use All**.

**MANUAL TRAVERSE MISSION - Continued**

10. Verify and record the following data on the Solution/Gun Orders screen:

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	2813	2		1103	34	A	2736	2605
A2	FFE	WR	2806	2		1097	34	A	2744	2628
A3	FFE	WR	2799	2		1090	34	A	2750	2650
A4	FFE	WR	2792	2		1083	34	A	2758	2673

11. Click **Srch/Trav Data** to display the S/T Round & Hand Wheel Fire Data screen. Verify and record the data as shown and click **Use All**.

S/T Round & Hand Wheel Fire Data  
 Rounds per Weapon   
 Deflection  
 Turns Between Rnds 1.0  
 Total Turns LEFT 2.0  
 Elevation  
 Turns Between Rnds  
 Total Turns

12. From the Solution/Gun Orders screen, call out the firing data to the guns and click **Shot**.

*FO calls: End mission, do not save*

13. Record burst point grid and altitude on DA 2399-R.

14. From the End of Mission (EOM) screen, select **EOM - No Save** and click **Use All**.

15. If necessary, change the amount of rounds on the Ammunition Expended screen. Click **Use All**.

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**DIGITAL MISSION SETUP**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:****References**

WP 0008 00  
WP 0009 00  
WP 0010 00  
WP 0012 00  
WP 0013 00

**References - Continued**

WP 0014 00  
WP 0015 00  
WP 0016 00  
WP 0040 00

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**GENERAL**

This work package provides the data that needs to be entered to perform the digital missions (missions from the Forward Observer (FO) or the Fire Support Element (FSE)) in this TM.

The examples for the digital missions in this TM were developed using the M32 LHMBC with the Commo and GPS turned on.

The LHMBC software V2.2 D1 B2 and BK 1.36 was used to develop the digital missions examples. Mission solutions may differ if a different software version is used. The software version information is located on the Status screen (see WP 0014 00) and the LHMBC Maintenance screen (see WP 0040 00).

**DIGITAL MISSION SETUP****NOTE**

Refer to the following list for WPs containing detailed information about the screens in this WP.

System Startup Settings	WP 0008 00
Geographical Reference	WP 0009 00
Unit List	WP 0010 00
Ammunition	WP 0011 00
Setup Data	WP 0012 00
Communications	WP 0013 00
Met	WP 0015 00
Safety Fan	WP 0016 00

1. Turn on the Commo and GPS on the System Startup Settings screen when starting the LHMBC software.

**DIGITAL MISSION SETUP - Continued**

2. Enable Commo by using one of the following methods (wire or radio):

a. Wire: Click **Menu/Commo/Channel Params** and enter the following data:

**Setup Commo Parameters**

Tcim	Channel Status	Protocol
1	ACTIVE	A220
Dev Type	Comsec Mode	Nad Method
2 WIRE	PLAIN TEXT	DAPNAD
Modulation	Fh Mode	Net Usage
FSK-188C	SINGLE CHANNEL	DATA ONLY
Data Rate	Rank	Num Stations
1200	2	3
Edc Mode	Defaults	Radio
FEC_TDC		Wire

b. Radio: Click **Menu/Commo/Channel Params** and enter the following data:

**Setup Commo Parameters**

Tcim	Channel Status	Protocol
1	ACTIVE	A220
Dev Type	Comsec Mode	Nad Method
SINGARS	PLAIN TEXT	DAPNAD
Modulation	Fh Mode	Net Usage
NRZ	SINGLE CHANNEL	DATA ONLY
Data Rate	Rank	Num Stations
4800	1	2
Edc Mode	Defaults	Radio
FEC_TDC		Wire

3. Click **Menu/Setup/Geo Ref** to enter the following data:

**Setup Geographical Reference**

Ellipsoid	Datum	Minimum			
		Easting	Northing	Zone	Hemi
WGS 1984	WE WORLD GEODETIC SYSTEM 1984	687000	3569000	16	North

4. Click **Menu/Setup/Data** to enter the following data:

### Setup Data

Security Mode	Target Block				Splash	Audio Alarm
	Prefix	Min	Max	Next		
UNCLASSIFIED	AB	1	100	1	5 seconds	On

5. Click **Menu/Unit List** to enter the following data:

### Unit List

Unit	Device	Obs	Wpn	Mount	Mnt Az	Use Ref	Prop Temp	Position
A1	GUN	99	M252	GROUND	4000	2800	70	19467 96853 0150 16 N WE
A2	GUN	98	M252	GROUND	4000	2800	70	19432 96854 0150 16 N WE
A3	GUN	97	M252	GROUND	4000	2800	70	19397 96854 0150 16 N WE
A4	GUN	96	M252	GROUND	4000	2800	70	19362 96854 0150 16 N WE
FDC	FDC							19470 96790 0150 16 N WE
FO	FO	1						15653 90443 0175 16 N WE
FSE	FSE							15653 90443 0175 16 N WE

### NOTE

Ensure **Controlling FSE** is checked for the FSE.

6. Click **Menu/Ammo/Ammo List** (or **Ammo List** from the Unit List screen) to enter the following data:

### Ammunition

Unit	Lot	Shell-Fuze	Quantity	Lot Num
A1	A	HE M821A2-M734A1	100	A
A1	B	IL M853A1-M772	100	B
A1	C	WP M375A3-M524	200	C
A2	A	HE M821A2-M734A1	100	A
A2	B	IL M853A1-M772	100	B
A2	C	WP M375A3-M524	200	C
A3	A	HE M821A2-M734A1	100	A
A3	B	IL M853A1-M772	100	B
A3	C	WP M375A3-M524	200	C
A4	A	HE M821A2-M734A1	100	A
A4	B	IL M853A1-M772	100	B
A4	C	WP M375A3-M524	200	C



**DIGITAL MISSION SETUP - Continued**

7. Unless a Registration mission is being performed, click **Menu/Met/Current** to ensure the MET is set to **Standard MET**. If performing a Registration mission, click **Menu/Met/New** and enter the following data:

**Met Edit Station**

Station Name	Octant	Station Height	MDP Pressure	Latitude	Longitude
METCM	0	37	977	347	983

**Met Current**

	Alt	Dir	Speed	Temp	Press
0	0	160	7	2900	977
1	200	187	11	2887	965
2	500	220	15	2878	937
3	1000	248	17	2868	893
4	1500	278	13	2852	842
5	2000	320	11	2830	793
6	2500	362	13	2796	746
7	3000	378	16	2766	701
8	3500	384	17	2737	659

8. If performing a Registration mission, click **Menu/Setup/Safety Fan** to enter the following data:

**Safety Fan**

Segment	Left Az	Right Az	Min Range	Max Range	Min Charge	Max Charge	Ammo Allowed	Origin
1	3440	4460	2500	5800	0	4	HE ILL WP	19432 96854 0150 16 N WE
2	4460	4600	4000	5000	2	4	HE ILL WP	19432 96854 0150 16 N WE

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**DIGITAL BASIC FIRE MISSION**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:****References**

DA Form 2399-R  
WP 0013 00  
WP 0022 00

**Equipment Conditions**

Digital Mission Setup, WP 0027 00  
Communications Cable Setup, WP 0031 00

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**GENERAL**

This work package provides procedures for conducting a digital basic fire mission from the FO or FSE.

The LHMBBC software can handle up to six active missions at a time.

**NOTE**

The data on the screens will vary depending on the type of mission data and adjustments selected.

**TARGET SCREEN**

When a mission is started, a Target screen is created for that mission and provides the means to review, verify, or adjust the mission. The target number (e.g., AB0001) is displayed at the top of the screen and there are control buttons for the operator to be able to review and verify mission data and to modify or end a mission.

A control button with the target number (e.g., **AB0001**) is displayed on all the mission screens when a mission is started. When clicked, the Target screen is displayed.

AB0001

Mission Log	Gun Select
Mission Data	Subs Adjust
Solution	Adj Sheaf
Safety Data	EOM
RePlot	Smoke Card
Msn Status	
Msn Messages	

**NOTE**

See WP 0022 00 for function/screens not covered in this WP.

## DIGITAL GRID MISSION

The following is an example of a digital grid mission with a subsequent adjustment for Adjust Fire and Fire For Effect.

*FO sends: Adjust fire  
16400 93500 100  
GTL  
Vehicle unknown  
Use HE I/ADJ HEQ I/FFE  
Fire when ready*

### New Call for Fire Screen

The New Call For Fire screen provides the means to review a mission and to either process or delete it. A mission priority icon (e.g., “R”) is displayed on the **Menu**. An exclamation point (!) is displayed next to the mission until the audio alarm is deactivated.

1. Upon receiving the mission, click **Menu/Call For Fire** to display the New Call For Fire screen.

New Call For Fire

	Pri	From	Desc	OrigDTG	RecvDTG

Delete

MTO Deny

Op Ack

Process

- a. The status of the mission (e.g., new/processed) is displayed.
- b. The **Pri** is the priority of the mission.
- c. The **From** is who sent the mission.
- d. The **Desc** is the type of mission.
- e. The **OrigDTG** is the date-time-group of the originator.
- f. The **RevDTG** is the date-time-group of the receiver.
- g. The mission is reviewed in the log window.

**Op Ack** - Turns off the audio alarm for the selected mission.

**MTO Deny** - Sends a message to the originator that the mission is denied.

**Process** - Processing the selected mission.

2. If necessary, select the NEW ADJUST FIRE message and deactivate the audio alarm.
3. Reselect the NEW ADJUST FIRE mission. Verify and record the data in the log window. Click **Process**.

### Mission Data Screen

#### NOTE

See WP 0022 00 for information on the Mission Data screen. (When Commo is turned on, the Mission Data screen displays **MTO Deny**.)

Verify or change the data on the Mission Data screen (the **Adj Gun** needs to be changed **A2**) and click **Use All**.

### Errors and Warning Screen

#### NOTE

See WP 0022 00 for information on the Errors and Warnings screen. (When Commo is turned on, the Errors and Warnings screen displays **MTO Deny**.)

If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)

### Solution/Gun Orders Screen

#### NOTE

See WP 0022 00 for information on the Solution/Gun Orders screen. (When Commo is turned on, the Solution/Gun Orders screen displays **MTO Accept** and **MTO Deny**.)

1. Verify and record the following data on the Solution/Gun Orders screen.

**Solution/Gun Orders**

<b>Gun</b>	<b>MOF</b>	<b>MOC</b>	<b>Defl</b>	<b>Ch</b>	<b>FS</b>	<b>Elev</b>	<b>TOF</b>	<b>Lot</b>	<b>Aim Az</b>	<b>Range</b>
<b>A2</b>	<b>ADJ</b>	<b>WR</b>	<b>2854</b>	<b>4</b>		<b>1144</b>	<b>48</b>	<b>A</b>	<b>3949</b>	<b>4521</b>

2. Click **MTO Accept** to send a message to the FO.

### Send Status Screen

#### NOTE

See WP 0013 00 for information on the Send Status screen.

## DIGITAL GRID MISSION - Continued

### Mission Status Screen

The Mission Status screen provides the means to verify the status of shots fired during a mission, send a splash message, and calculate the rounds completed in a mission.

1. Click the target number to display the Target screen and then click **Msn Status** to display the Mission Status screen.

Mission Status

Ready	Shot	Cmplt	Gun	MOC	
			A1	DNL	▲
			A2	DNL	≡
			A2	WR	□
			A3	DNL	▼
			A4	DNL	

	Shot
	Splash
AB0001	Rnds Complete
Menu	

- a. **Ready**, **Shot**, and **Cmplt** show the status of the mission.
- b. The **Gun** shows the guns being used in the mission.
- c. **MOC** can be **AMC**, **DNL**, **FFE**, or **WR**.

**Shot** - Sends a message to the FO that shots were fired.

**Splash** - Sends a splash message to the FO without displaying the countdown.

**Rnds Complete** - Calculates the rounds fired during a mission.

2. Click **Shot**. The Send Status screen is displayed showing a green **MACK**. Click **Close** to return to the Mission Status screen. A green check is displayed for **Ready** and **Shot** for the gun(s) being used for that shot.

## NOTE

Do not click **Rnds Complete** at this time. A rounds complete message will be sent after the FFE is processed.

Mission Status

Ready	Shot	Cmplt	Gun	MOC	
			A1	DNL	
✓	✓		A2	DNL	
			A2	WR	
			A3	DNL	
			A4	DNL	

	Shot
	Splash
AB0001	Rnds Complete

## Mission Messages Screen

The Mission Messages screen provides the means to review an adjustment and to either process or delete it. **NO MESSAGES** is displayed in the log until a mission is selected.

Mission Messages

Pri	From	Desc...	OriginatorDTG	Re
NO MESSAGES				

	Delete
	Op Ack
AB0001	Process

- a. The status of the mission (e.g., new/processed) is displayed.
- b. The **Pri** is the priority of the mission.
- c. The **From** is who sent the mission.
- d. The **Desc** is the type of mission.
- e. The **OrigDTG** is the date-tim-group of the originator.
- f. The **RevDTG** is the date-time-group of the receiver.
- g. The mission is reviewed in the log window.

**Op Ack** - Turns off the audio alarm for the selected mission.

**DIGITAL GRID MISSION - Continued****Subsequent Adjust (Adjust Fire)****NOTE**

See WP 0022 00 for information on the Subsequent Adjust screen.

1. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: Left 10, Drop 100*

2. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW SUBSADJ message. Verify and record the information. Click **Process**.
3. The Errors and Warnings screen is displayed for A2 and A3 guns. Since the rounds will not strike each other, click **Msn Solution** to override the message.
4. Verify and record the following data on the Solution/Gun Orders screen.

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2878	4		1158	48	A	3926	4423

5. From the Mission Status screen, click **Shot**. (Do not click **Rnds Complete**.)
6. From the Send Status screen, click **Close**. The Mission Status screen displays a green check mark on **Ready** and **Shot**.

**NOTE**

A yellow warning triangle is displayed because of the earlier warning of rounds crossing.

**Subsequent Adjust (Fire For Effect)**

1. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: Add 50, FFE*

2. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW SUBSADJ message. Verify and record the information. Click **Process**.
3. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)
4. Verify and record the following information on the Solution/Gun Orders screen.

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
SEC	FFE	WR	2877	4		1151	48	A	3926	4473

5. Click the target number and then click **Msn Status** to display the Mission Status screen and click **Shot**.
6. Click **Close** to close the Send Status screen.

7. From the Mission Status screen, click **Rnds Complete**.
8. Click **Close** to close the Send Status screen. The Mission Status screen displays a green check mark under **Ready**, **Shot**, and **Cmplt** for all the guns.

### End of Mission (EOM)

#### NOTE

See WP 0022 00 for information on the screens when ending a mission.

1. Click **Msn Messages** from the Target screen and wait for directions from the FO.  
*FO sends: End mission, assign known point*
2. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW EOM message. Verify and record the information. Click **Process**.
3. From the Select Known Point Number screen, click **Save As KP01**.

### Ammunition Expended Screen

#### NOTE

See WP 0022 00 for information on the Ammunition Expended screen.

If necessary, change the amount of rounds on the Ammunition Expended screen and click **Use All**.

### END OF WORK PACKAGE



## OPERATOR MAINTENANCE

### LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

### DIGITAL REGISTRATION MISSION OPERATION UNDER USUAL CONDITIONS

#### INITIAL SETUP:

##### References

DA Form 2399-R  
WP 0022 00  
WP 0028 00

##### Equipment Conditions

Digital Mission Setup, WP 0027 00  
Communications Cable Setup, WP 0031 00

#### GENERAL

This work package provides procedures for conducting a digital registration mission from FO or FSE.

#### NOTE

For detailed information about the mission screens in this WP, see WP 0022 00 ("Manual Basic Fire Missions") and WP 0028 00 ("Digital Basic Fire Mission").

#### DIGITAL REGISTRATION MISSION

The following is an example of a digital registration mission with a subsequent adjustments for Adjust Fire and Fire For Effect.

*FO sends: Adjust fire reg  
16400 93800 150 16  
Dir 240  
RP 01  
Use HE I/ADJ  
Fire when ready*

1. Upon receiving the mission, click **Menu/Call For Fire**.
2. If necessary, deactivate the audio alarm on the New Call For Fire screen. Select the NEW REG message. Verify and record the data. Click **Process**.
3. Verify or change the data on the Mission Data screen (the **Adj Gun** needs to be changed A2) and click **Use All**.
4. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)
5. Verify and record the data on the Solution/Gun Orders screen.

#### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2822	4		1168	48	A	3996	4304

6. Click **MTO Accept**.

**DIGITAL REGISTRATION MISSION - Continued**

7. From the Send Status screen, click **Close**.
8. Check to see if green check mark is displayed on **MTO Accept** on the Solution/Gun Orders screen.
9. From the Mission Status screen, click **Shot**. (Do not click **Rnds Complete**.)
10. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: Left 100, Drop 100*

11. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW SUBSADJ message. Verify and record the data. Click **Process**.
12. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)
13. Verify and record the data on the Solution/Gun Orders screen.

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2814	4		1148	48	A	4004	4441

14. From the Mission Status screen, click **Shot**. (Do not click **Rnds Complete**.)
15. From the Send Status screen, click **Close**.
16. Check to see if green check mark is displayed on **MTO Accept** on the Solution/Gun Orders screen.
17. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: Drop 50*

18. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW SUBSADJ message. Verify and record the data. Click **Process**.
19. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)
20. Verify and record the data on the Solution/Gun Orders screen.

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2820	4		1141	48	A	3998	4484

21. From the Mission Status screen, click **Shot**. (Do not click **Rnds Complete**.)
22. From the Send Status screen, click **Close**.
23. Check to see if green check mark is displayed on **MTO Accept** on the Solution/Gun Orders screen.

24. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: Add 20*

25. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW SUBSADJ message. Verify and record the data. Click **Process**.
26. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)
27. Verify and record the data on the Solution/Gun Orders screen.

#### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	ADJ	WR	2818	4		1144	47	A	4000	4468

#### NOTE

The FDC sends a PTM to the FO: "Prepare to adjust sheaf section right (#2 Gun DNF)".

28. From the Subsequent Adjust screen, enter the adjustments (change **MOF** to **FFE**) and click **Use All**.
29. Verify and record the data on the Solution/Gun Orders screen.

#### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A2	FFE	WR	2814	4		1144	47	A	4000	4468

30. From the Mission Status screen, click **Shot**. (Do not click **Rnds Complete**.)

#### NOTE

After observing the fired rounds, the FO sends a PTM to the FDC with sheaf corrections "A1 Left 10".

31. Click **Menu/Commo/PTM/Read** to read the PTM and click **Delete**.
32. Click **Menu/ Mission/FPF** and select the appropriate target number.
33. From the Adjust Sheaf screen, enter the adjustment (enter **Left 10** for A1).
34. Verify and record the data on the Solution/Gun Orders screen.

#### Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	WR	2816	4		1142	47	A	4002	4482

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**DIGITAL REGISTRATION MISSION - Continued**

35. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: End mission, assign known point*

36. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the EOM ASSIGN KNOWN POINT 02 message. Verify and record the data. Click **Process**.

37. From the Save Registration Point screen, select a **To RP Num** and click **Save As RP#**.

38. From the Select Known Point Number screen, select a **Known Point** and a **Controlling FO**. Click **Save As KP#**.

39. If necessary, change the amount of rounds on the Ammunition Expended screen and click **Use All**.

**END OF WORK PACKAGE**

## OPERATOR MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

DIGITAL FINAL PROTECTIVE FIRE (FPF) MISSION  
OPERATION UNDER USUAL CONDITIONS

## INITIAL SETUP:

## References

DA Form 2399-R  
WP 0022 00  
WP 0028 00

## Equipment Conditions

Digital Mission Setup, WP 0027 00  
Communications Cable Setup, WP 0031 00

## GENERAL

This work package provides procedures for conducting a digital FPF mission from FO or FSE.

## NOTE

For detailed information about the mission screens in this WP, see WP 0022 00 ("Manual Basic Fire Missions") and WP 0028 00 ("Digital Basic Fire Mission").

## DIGITAL FPF MISSION

The following is an example of a digital FPF mission with a subsequent adjustments for Fire For Effect.

*FO sends: FPF  
17220 95460 150  
Dir 0300  
Special, length 150, width 35, attitude 0900  
At my command*

1. Upon receiving the mission, click **Menu/Call For Fire**.
2. If necessary, deactivate the audio alarm on the New Call For Fire screen. Select the NEW ASSIGN FPF message. Verify and record the data. Click **Process**.
3. Verify or change the data on the Mission Data screen (the **Adj Gun** needs to be changed **A4**, the Adj Gun **Fuze** needs to be changed to **DLY**, the FFE **Fuze** needs to be changed to **IMP**) and click **Use All**.
4. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)
5. Verify and record the data on the Solution/Gun Orders screen.

## Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A4	ADJ	AMC	2603	2		1171	35	A	4215	2499

**DIGITAL FPF MISSION - Continued**

6. Click **MTO Accept**.
7. From the Send Status screen, click **Close**.
8. Check to see if green check mark is displayed on **MTO Accept** on the Solution/Gun Orders screen.
9. From Mission Status screen, click **READY**. (Do not click **FIRE**.)
10. From the Send Status screen, click **Close**.

*FO sends: Fire*

11. From the Mission Status screen, click **Shot**. (Do not click **Rnds Complete**.)
12. From the Send Status screen, click **Close**.
13. Check to see if green check mark is displayed on **MTO Accept** on the Solution/Gun Orders screen.
14. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: Left 50*

15. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW SUBSADJ message. Verify and record the data. Click **Process**.
16. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)
17. Verify and record the data on the Solution/Gun Orders screen.

**Solution/Gun Orders**

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	FFE	DNL	2570	2		1114	34	A	4246	2730
A2	FFE	DNL	2576	2		1131	34	A	4241	2664
A3	FFE	DNL	2581	2		1147	35	A	4236	2598
A4	FFE	DNL	2587	2		1163	35	A	4230	2532

18. Verify the data on the Mission Data screen (**MOC** is **DNL**, **MOF** is **FFE**, **MOA** is **D/C**).

*FO sends: End FPF*

19. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the END FPF message. Verify and record the data. Click **Process**.
20. If the Errors and Warning screen is displayed, correct any solution errors or warnings. (If errors or warnings cannot be corrected, click **MTO Deny** from the New Call For Fire screen.)

21. Verify and record the data on the Solution/Gun Orders screen.

Solution/Gun Orders

Gun	MOF	MOC	Defl	Ch	FS	Elev	TOF	Lot	Aim Az	Range
A1	CONT	DNL	2570	2		1114	34	A	4246	2730
A2	CONT	DNL	2576	2		1131	34	A	4241	2664
A3	CONT	DNL	2581	2		1147	35	A	4236	2598
A4	CONT	DNL	2587	2		1163	35	A	4230	2532

*FO sends: Fire FPF*

22. From the Mission Status screen, click **Shot**.
23. From the Send Status screen, click **Close**.
24. From the Mission Status screen, click **Rds Complete**.
25. From the Send Status screen, click **Close**.
26. Check to see if green check mark is displayed on **MTO Accept** on the Solution/Gun Orders screen.
27. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: End FPF*

28. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW END FPF message. Verify and record the data. Click **Process**.
29. Click **Msn Messages** from the Target screen and wait for directions from the FO.

*FO sends: Delete FPF*

30. If necessary, deactivate the audio alarm on the Mission Messages screen. Select the NEW DELETE FPF message. Verify and record the data. Click **Process**.
31. If necessary, change the amount of rounds on the Ammunition Expended screen and click **Use All**.

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**COMMUNICATIONS CABLE SETUP**  
**OPERATION UNDER USUAL CONDITIONS**

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**INITIAL SETUP:**

None

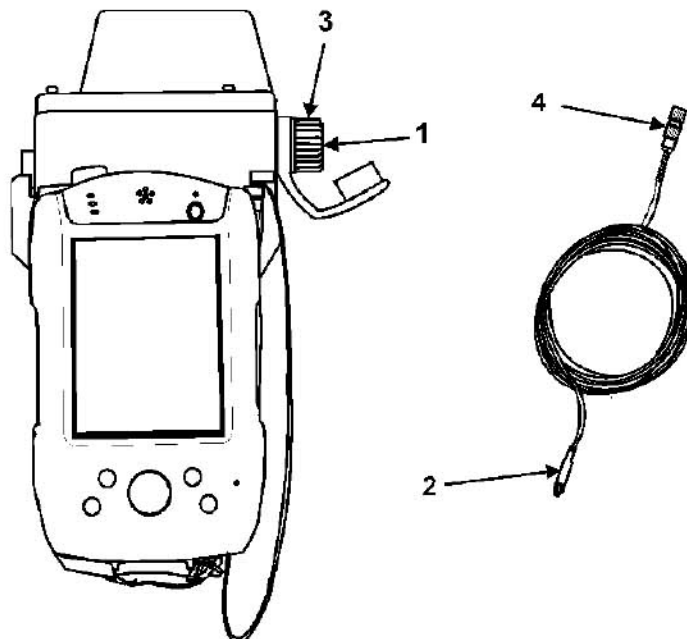
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**GENERAL**

This work package provides procedures for setting up the radio cable and the two wire cable needed for digital missions.

**RADIO CABLE**

1. Remove the connector covers from the communications connector (1) on top of the LHMBC and the cable connector (2) on the radio cable.
2. Insert the cable connector (2) into the communications connector (1) and twist the cable connector (2) back and forth while pushing the cable down until it clicks into place.
3. Tighten the communications connector knob (3) clockwise to secure the cable connector (2) in place.
4. Attach the cable connector (4) to the audio data connector on the bottom of the radio (AUD/DATA port).



**END OF WORK PACKAGE**



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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**OPERATION UNDER UNUSUAL CONDITIONS**

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**INITIAL SETUP:****Materials/Parts**

Cloth (WP 0054 00)

**References**

WP 0040 00

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**GENERAL**

This work package provides procedures for operating the M32 LHMBC during unusual environment/weather, and interim Nuclear, Biological, and Chemical (NBC) decontamination.

**UNUSUAL ENVIRONMENT/WEATHER****WARNING**

To prevent personal injury, death or equipment damage while operating the M32 LHMBC during electrical storms, ensure any wireline adapter is properly earth grounded.

**CAUTION**

In extreme hot and cold temperatures, the LHMBC must be operated using external power. The main internal battery will not charge or provide sufficient power to operate the system.

**NOTE**

If the LHMBC fails to operate at an extreme temperature (hot or cold), perform a soft reset or disconnect the main internal battery and then reconnect it (see WP 0040 00). This operation will reinitialize the charging circuitry and may allow the LHMBC to operate in extreme temperatures.

**Operation in Desert Climates**

In desert climates, the equipment connectors and receptacles are subject to damage from windblown sand and dust. Do not leave the connectors and receptacles uncovered. Do not put a cable end on the ground unless the protective cover is on the connector.

**Operation in Arctic Climates**

In extreme cold temperatures, the AA battery life may be reduced and the LHMBC may lock up. To improve the M32 LHMBC's performance in freezing temperatures, always enable Commo.

Arctic climates cause the cables to become hard, brittle, and difficult to handle. When handling and connecting the cables, avoid kinks and unnecessary cable loops or damage to cable may result. Make sure all the connections are free of frost, snow, and ice. Never drag a connector on the ground or place an open connector in the snow.

**Operation in Tropical Climates**

Tropical climates cause condensation to form on the LHMBC. Wipe moisture and fungi off the equipment with a lint-free cloth.

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**INTERIM NUCLEAR, BIOLOGICAL, AND CHEMICAL (NBC) DECONTAMINATION PROCEDURES**

When operating in an NBC environment, the M32 LHMBC operator must be dressed in MOPP IV gear. After the mission is completed, the LHMBC must be sent to the nearest decontamination facility. The M32 LHMBC contamination level should then be evaluated. If it is determined there is no contamination or the contamination is minimal and can be corrected without causing any damage to the hardware, then the M32 LHMBC should be serviced and returned to the originating unit. However, if it is determined the level of contamination is significant and decontamination of the M32 LHMBC will damage the hardware components, the M32 LHMBC will be discarded.

**END OF WORK PACKAGE**

## **CHAPTER 3**

# **OPERATOR TROUBLESHOOTING PROCEDURES FOR LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

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**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****TROUBLESHOOTING INTRODUCTION**

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**MALFUNCTION/SYMPTOM INDEX**

The malfunction/symptom index is a quick-reference index for finding troubleshooting procedures.

Associated with the malfunction/symptom name is a work package sequence number representing the starting point in a troubleshooting sequence. Should any one malfunction/symptom require more than one troubleshooting sequence to arrive at the most likely area of investigation, the additional starting numbers are presented.

As the troubleshooting activity progresses through to the conclusion of a particular sequence, a reference is made to the next logical troubleshooting sequence by work package sequence number or by referring to the malfunction/symptom index to locate the next failure symptom work package. This type of activity continues until successful fault isolation is achieved.

**TROUBLESHOOTING PROCEDURES**

The troubleshooting work package contains symptoms, malfunctions, and corrective actions required to return the M32 LHMBBC to normal operation. Perform the steps in the order they appear.

The work package is headed by an initial setup. This setup outlines what is needed as well as certain conditions which must be met before starting the task. **DON'T START A TASK UNTIL:**

- You understand the task.
- You understand what you are to do.
- You understand what is needed to do the work.
- You have the things you need.

This manual cannot list all malfunctions that may occur, or all probable causes and corrective actions. If a malfunction is not listed or is not corrected by listed corrective actions, notify your supervisor or unit maintenance.

## OPERATOR MAINTENANCE

### LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, XM32

(NSN 7021-01-521-1611, PN 13007892)

#### OPERATOR MALFUNCTION/SYMPTOM INDEX

<u>Malfunction/Symptom</u>	<u>Troubleshooting Procedure</u>
<b>M32 LHMBC TROUBLESHOOTING</b>	
<b>Power/Batteries</b>	
1. LHMBC fails to wake up with Sleep button.....	WP 0035 00
2. LHMBC fails to enter Sleep Mode with Sleep button.....	WP 0035 00
3. Battery adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing) .....	WP 0035 00
4. AC adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing) .....	WP 0035 00
5. DC/DC converter and DC power cable fail to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing) .....	WP 0035 00
6. Charging LED not functioning properly .....	WP 0035 00
<b>Global Positioning System (GPS)</b>	
7. GPS capability not available (GPS control button not displayed in LHMBC software).....	WP 0035 00
8. "GPS not functioning" or "GPS not communicating" message displayed on GPS screen .....	WP 0035 00
9. GPS functioning but position not available .....	WP 0035 00
10. GPS key not loading .....	WP 0035 00
<b>Communications (Commo)</b>	
11. Commo capability not available (Commo control button not displayed in LHMBC software).....	WP 0035 00
12. Unable to establish digital communications with any other unit (channel enabled successfully).....	WP 0035 00
13. Digital communications successful with some units and fails with other units.....	WP 0035 00
14. "Enable channel unsuccessful" message appears after clicking <b>Enable Channel</b> .....	WP 0035 00
<b>LHMBC Software</b>	
15. Password not working or unknown.....	WP 0035 00
16. LHMBC software fails to start or not responding.....	WP 0035 00
17. <b>Install</b> not appearing in iPAQ file store .....	WP 0035 00

**Malfunction/Symptom****Troubleshooting Procedure****LHMBC Software - Continued**

18. Keyboard not responding or missing during LHMBC software use .....	WP 0035 00
19. Audio alarm not working within LHMBC .....	WP 0035 00
20. Backup, Restore, BIT, Clear Data, Factory Database, or Zeroize GPS failed when run from LHMBC Maintenance screen .....	WP 0035 00
21. Processing wheel present for more than one minute.....	WP 0035 00
22. Ballistic solutions on LHMBC and check computer do not match.....	WP 0035 00
23. Unencrypted card message appears .....	WP 0035 00

**Hardware**

24. Stylus broken or missing.....	WP 0035 00
25. Touch screen responds inaccurately to screen taps .....	WP 0035 00
26. Backlight not functioning properly .....	WP 0035 00
27. Soft reset not working .....	WP 0035 00
28. Hot key button(s) not working .....	WP 0035 00

**Miscellaneous**

29. "Unrecognized card in socket" warning in operating system .....	WP 0035 00
30. LHMBC locks up due to extreme weather.....	WP 0035 00

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**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****OPERATOR TROUBLESHOOTING PROCEDURES**

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**INITIAL SETUP:****References**

WP 0005 00  
WP 0032 00  
WP 0040 00

**Equipment Conditions**

Troubleshooting Introduction (WP 0033 00)

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**POWER/BATTERIES****1. SYMPTOM**

LHMBC fails to wake up with Sleep button.

**MALFUNCTION**

LHMBC in Standby Mode or Storage (electronically disconnected) or Sleep button broken.

**CORRECTIVE ACTION**

STEP 1. Ensure external power is present.

STEP 2. Press and hold Soft Reset button for 5 seconds.

STEP 3. If LHMBC turns on and Sleep button functions properly, LHMBC was in Standby Mode (due to low main internal battery level) or Storage.

STEP 4. If LHMBC wakes up but Sleep button is not functional, Sleep button is broken. Continue using LHMBC but use Autosleep to put LHMBC to sleep. Notify unit maintenance when possible.

STEP 5. If LHMBC does not wake up, continue with next malfunction.

**MALFUNCTION**

Main internal battery dormant.

**CORRECTIVE ACTION**

STEP 1. Replace main internal battery with charged main internal battery.

STEP 2. Attempt to turn on LHMBC with Sleep or Soft Reset button. If LHMBC turns on, main internal battery was dormant. If situation permits, attempt to revive the dormant battery by charging it for up to 5 days. If necessary, return dormant main internal battery to unit maintenance.

STEP 3. If problem persists, continue with next malfunction.

**MALFUNCTION**

LHMBC damaged.

**CORRECTIVE ACTION**

Return LHMBC to unit maintenance.

**POWER/BATTERIES - Continued****2. SYMPTOM**

LHMBC fails to enter Sleep Mode with Sleep button.

**MALFUNCTION**

Sleep button damaged or broken.

**CORRECTIVE ACTION**

Soft reset LHMBC (see WP 0040 00) and retry Sleep button. If problem is resolved, LHMBC had locked up. If problem is not resolved, Sleep button is broken. Continue using LHMBC but use Autosleep to put LHMBC to sleep. Notify unit maintenance when possible.

**3. SYMPTOM**

Battery adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing).

**NOTE**

If the battery adapter determines the LHMBC is sufficiently charged, it will periodically cycle off to conserve AA batteries. When this occurs, the LHMBC indicates that no external power is present. To verify the AA batteries are properly charged, remove and re-insert battery holder.

**MALFUNCTION**

AA batteries dead or incorrectly oriented, or AA holder inserted upside down.

**CORRECTIVE ACTION**

STEP 1. Ensure AA batteries of same type are being used.

STEP 2. Verify all AA batteries are correctly oriented.

STEP 3. Verify AA holder is inserted correctly into battery adapter and properly seated. (AA holder should be inserted into battery adapter contacts end first.)

STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

Battery adapter not connected securely.

**CORRECTIVE ACTION**

STEP 1. Disconnect battery adapter from LHMBC.

STEP 2. Clean contacts on battery adapter and LHMBC.

STEP 3. Re-attach battery adapter to LHMBC.

STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

Extreme temperature preventing internal batteries from charging.

**CORRECTIVE ACTION****NOTE**

LHMBC internal batteries may not charge at extreme temperatures.

See WP 0032 00.



**MALFUNCTION**

Battery adapter, battery holder, or LHMBC damaged.

**CORRECTIVE ACTION**

- STEP 1. Use alternate external power source to charge LHMBC (see WP 0040 00). If problem persists, LHMBC may be damaged. Notify unit maintenance.
- STEP 2. If problem persists, replace AA holder with a known working AA holder and attempt to charge LHMBC. If LHMBC charges with new AA holder, original AA holder is damaged. Notify unit maintenance.
- STEP 3. If problem persists, replace battery adapter with a known working battery adapter, if available, and attempt to charge LHMBC. If LHMBC charges with new battery adapter, original battery adapter is damaged. Notify unit maintenance.

**4. SYMPTOM**

AC adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing).

**MALFUNCTION**

Electrical outlet not functional.

**CORRECTIVE ACTION**

- STEP 1. Verify electrical outlet is working correctly and AC adapter plug is fully inserted.
- STEP 2. If problem persists, continue with next malfunction.

**MALFUNCTION**

AC adapter not connected securely.

**CORRECTIVE ACTION**

- STEP 1. Disconnect AC adapter from LHMBC.
- STEP 2. Clean contacts on AC adapter and LHMBC.
- STEP 3. Re-attach AC adapter to LHMBC.
- STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

Extreme temperature preventing internal batteries from charging.

**CORRECTIVE ACTION****NOTE**

LHMBC internal batteries may not charge at extreme temperatures.

See WP 0032 00.

**MALFUNCTION**

AC adapter or LHMBC damaged.

**CORRECTIVE ACTION**

Use alternate external power source to charge LHMBC (see WP 0040 00). If alternate source fixes problem, AC adapter may be damaged. Otherwise, LHMBC may be damaged. Notify unit maintenance.

**POWER/BATTERIES - Continued****5. SYMPTOM**

DC/DC converter and DC power cable fail to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing).

**MALFUNCTION**

DC power connections not secure.

**CORRECTIVE ACTION**

STEP 1. Ensure DC/DC converter and cables are connected securely to vehicle and LHMBC. Clean all connector contacts and securely connect LHMBC power cable to LHMBC and NATO connector to vehicle NATO jack.

STEP 2. If problem persists, continue with next malfunction.

**MALFUNCTION**

Extreme temperature preventing internal batteries from charging.

**CORRECTIVE ACTION****NOTE**

LHMBC internal batteries may not charge at extreme temperatures.

See WP 0032 00.

**MALFUNCTION**

Vehicle battery dead, DC power cable damaged, DC/DC converter damaged, or LHMBC faulty.

**CORRECTIVE ACTION**

STEP 1. Verify vehicle battery is charged.

STEP 2. If problem persists, attempt to charge LHMBC using alternate DC power source. If this fixes the problem, DC power cable was damaged. Notify unit maintenance.

STEP 3. If problem persists, attempt to charge LHMBC using AA batteries or AC power. If this fixes the problem, DC/DC converter was damaged. Notify unit maintenance.

STEP 4. If problem persists, LHMBC is faulty. Notify unit maintenance.

**6. SYMPTOM**

Charging LED not functioning properly.

**MALFUNCTION**

No external power source present.

**CORRECTIVE ACTION**

STEP 1. Ensure external power source is present and connected securely.

STEP 2. Check charging status in operating system for main internal battery (**Start/Settings/System** tab/**Power** icon/**Main** tab). If main internal battery is charging, "Charging" is displayed next to main battery bar. Also, charging LED should blink orange. If all internal batteries are fully charged, charging LED indicator should be constant orange when external power is applied.

STEP 3. Perform self-test on LED. If LED fails self-test or does not function correctly, LED may be broken. Notify unit maintenance.

---

**GLOBAL POSITIONING SYSTEM (GPS)****7. SYMPTOM**

GPS capability not available (GPS control button not displayed in LHMBC software).

**MALFUNCTION**

No expansion pack present.

**CORRECTIVE ACTION**

STEP 1. Ensure M32 system, complete with expansion pack, is being used.

STEP 2. Perform soft reset (see WP 0040 00).

STEP 3. If problem persists, continue with next malfunction.

**MALFUNCTION**

Extended battery level low.

**CORRECTIVE ACTION**

STEP 1. Verify extended battery in expansion pack is sufficiently charged (see WP 0005 00). If extended battery is low, GPS may be lost.

STEP 2. Ensure external power is present.

STEP 3. Restart LHMBC software and check for GPS availability on System Startup Settings screen.

STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

GPS not selected on System Startup Settings screen.

**CORRECTIVE ACTION**

STEP 1. Restart LHMBC software.

STEP 2. Select "ON" for GPS on System Startup Settings screen.

STEP 3. If System Startup Settings screen is not displayed or problem persists, continue with next malfunction.

**MALFUNCTION**

LHMBC not recognizing internal GPS card.

**CORRECTIVE ACTION**

STEP 1. Perform up to three soft resets of system (see WP 0040 00). After each soft reset, restart LHMBC software and check for GPS availability on System Startup Settings screen.

STEP 2. If problem persists, continue with next malfunction.

**MALFUNCTION**

Expansion pack not connected securely to computer.

**CORRECTIVE ACTION**

STEP 1. Remove and securely reconnect expansion pack (see WP 0040 00).

STEP 2. Perform soft reset (see WP 0040 00) and check for GPS availability on System Startup Settings screen.

STEP 3. If problem persists, notify unit maintenance.

---

**GLOBAL POSITIONING SYSTEM (GPS) - Continued****8. SYMPTOM**

“GPS not functioning” or “GPS not communicating” message displayed on GPS screen.

**MALFUNCTION**

GPS not yet initiated.

**CORRECTIVE ACTION**

STEP 1. GPS may take up to 3 minutes to initialize once LHMBBC software has started. Wait 3 minutes to ensure adequate time was allowed.

STEP 2. Go to Setup Geographical Reference screen (see WP 0009 00) and click **Use All**. Wait 3 minutes.

STEP 3. Click **Standby** (GPS will enter Standby Mode). Click **Continuous** and wait 3 minutes.

**MALFUNCTION**

GPS malfunctioned.

**CORRECTIVE ACTION**

STEP 1. Perform soft reset (see WP 0040 00).

STEP 2. If problem persists, notify unit maintenance.

**9. SYMPTOM**

GPS functioning but position not available.

**MALFUNCTION**

Position not yet acquired.

**CORRECTIVE ACTION**

STEP 1. Ensure correct Map Mod has been entered on the Geo Ref screen.

STEP 2. Obtain clear line of sight of sky.

STEP 3. Allow time for GPS to obtain satellites.

**MALFUNCTION**

GPS position not meeting accuracy requirements.

**CORRECTIVE ACTION**

STEP 1. GPS reported accuracy must be less than 25 meters to be applied. Wait for accuracy to improve before attempting to apply position.

STEP 2. If possible, move to alternate location to get GPS position.

STEP 3. If necessary, use alternate means of obtaining position.

**10. SYMPTOM**

GPS key not loading.

**MALFUNCTION**

LHMBC or GPS fill device not functioning properly.

**CORRECTIVE ACTION**

STEP 1. Ensure GPS fill device is working properly.

STEP 2. Soft reset LHMBC (see WP 0040 00) and start LHMBC software.

STEP 3. Go to GPS screen and attempt to fill LHMBC. If GPS screen displays error message, take appropriate action.

STEP 4. If problem persists, notify unit maintenance.

**COMMUNICATIONS (COMMO)****11. SYMPTOM**

Commo capability not available (Commo control button not displayed in LHMBC software).

**MALFUNCTION**

No expansion pack present.

**CORRECTIVE ACTION**

STEP 1. Ensure M32 system, complete with expansion pack, is being used.

STEP 2. Perform soft reset (see WP 0040 00).

STEP 3. If problem persists, continue with next malfunction.

**MALFUNCTION**

Extended battery level low.

**CORRECTIVE ACTION**

STEP 1. Verify extended battery in expansion pack is sufficiently charged (see WP 0005 00). If extended battery is low, Commo may be lost.

STEP 2. Ensure external power is present.

STEP 3. Restart LHMBC software and check for Commo availability on System Startup Settings screen.

STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

Commo not selected on System Startup Settings screen.

**CORRECTIVE ACTION**

STEP 1. Restart LHMBC software.

STEP 2. Select "ON" for Commo on System Startup Settings screen.

STEP 3. If System Startup Settings screen is not displayed or problem persists, continue with next malfunction.

**COMMUNICATIONS (COMMO) - Continued****MALFUNCTION**

Computer not recognizing internal modem card.

**CORRECTIVE ACTION**

STEP 1. Perform up to three soft resets of system (see WP 0040 00). After each soft reset, restart LHMBC software and check for Commo availability on System Startup Settings screen.

STEP 2. If problem persists, continue with next malfunction.

**MALFUNCTION**

Expansion pack connections not secure.

**CORRECTIVE ACTION**

STEP 1. Remove and securely replace expansion pack (see WP 0040 00).

STEP 2. Perform soft reset (see WP 0040 00) and check for Commo availability on System Startup Settings screen.

STEP 3. If problem persists, notify unit maintenance.

**12. SYMPTOM**

Unable to establish digital communications with any other unit (channel enabled successfully).

**MALFUNCTION**

Radio cable not securely connected.

**CORRECTIVE ACTION**

STEP 1. Disconnect radio cable.

STEP 2. Clean cable contacts and securely reconnect radio cable.

STEP 3. If problem persists, continue with next malfunction.

**MALFUNCTION**

Physical obstruction/distance.

**CORRECTIVE ACTION**

STEP 1. Radio communications may be affected by physical obstruction and/or distance. To ensure successful radio communication, locate within range of other units and avoid obstruction between radios.

STEP 2. If voice message traffic cannot be established, perform SINCGARS troubleshooting procedures (see TM 11-5820-890-10-7). If voice message traffic is established but digital messaging problem persists, continue with next malfunction.

**MALFUNCTION**

Radio settings inconsistent with LHMBC software settings or other unit radio settings.

**CORRECTIVE ACTION**

STEP 1. Ensure radio contains valid fill (key) and time sync.

STEP 2. Ensure following LHMBC settings match radio settings, as well as other unit radio settings:

- Data Rate
- Frequency
- Consec Mode
- FH Mode
- EDC Modes
- NAD Methods
- Net Usages
- Rank (should be different on all units)

STEP 3. Send a test PTM and watch signal strength indicator on radio to verify LHMBC is communicating with radio. If signal strength indicator spikes but PTM is not received, continue with next malfunction. If indicator does not spike, notify unit maintenance.

STEP 4. If signal strength indicator spikes but PTM is not received, continue with next malfunction. If indicator does not spike, notify unit maintenance.

**MALFUNCTION**

LHMBC addresses not consistent with other units or time not correct.

**CORRECTIVE ACTION**

STEP 1. Verify all URNs and IP addresses are consistent with other units.

STEP 2. Verify correct ZULU time is entered in LHMBC.

STEP 3. Ensure enabled checkbox is checked for all units.

STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

Modem card faulty or loose, or radio cable faulty.

**CORRECTIVE ACTION**

Notify unit maintenance.

---

**COMMUNICATIONS (COMMO) - Continued****13. SYMPTOM**

Digital communications successful with some units and fails with other units.

**MALFUNCTION**

LHMBC addresses inconsistent with other units or system times different.

**CORRECTIVE ACTION**

STEP 1. Verify all URNs and IP addresses are consistent with other units.

STEP 2. Ensure enabled checkbox is checked for all units.

STEP 3. Check Alerts screen for other possible errors.

STEP 4. Ensure all units have correct ZULU time.

STEP 5. If problem persists, continue with next malfunction.

**MALFUNCTION**

Radio settings inconsistent with other unit radio settings.

**CORRECTIVE ACTION**

STEP 1. Ensure other unit radio settings match the following LHMBC settings:

- Data Rate
- Frequency
- Consec Mode
- FH Mode
- EDC Modes
- NAD Methods
- Net Usages
- Rank (should be different on all units)

STEP 2. Ensure other unit radios contains valid fill (key), if necessary.

**MALFUNCTION**

Other subscriber(s) not functioning properly.

**CORRECTIVE ACTION**

Inform other subscriber(s) via voice that they may have a problem.



**14. SYMPTOM**

“Enable channel unsuccessful” message appears after clicking **Enable Channel**.

**MALFUNCTION**

Extended battery level low.

**CORRECTIVE ACTION**

STEP 1. Verify extended battery in expansion pack is sufficiently charged (see WP 0005 00). If extended battery is low, Commo may be lost.

STEP 2. Ensure external power is present.

STEP 3. Restart LHMBC software and check for Commo availability on System Startup Settings screen.

STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

Hardware malfunction.

**CORRECTIVE ACTION**

STEP 1. Attempt to enable channel.

STEP 2. Perform soft reset (see WP 0040 00) and attempt to enable channel again.

STEP 3. If problem persists, notify unit maintenance.

**LHMBC SOFTWARE****15. SYMPTOM**

Password not working or unknown.

**MALFUNCTION**

Password typed incorrectly.

**CORRECTIVE ACTION**

STEP 1. Retype password carefully. (Note that location of numbers are rearranged randomly each time.)

STEP 2. Try default password (**112233**).

STEP 3. If problem persists, continue with next malfunction.

**MALFUNCTION**

Password forgotten.

**CORRECTIVE ACTION**

STEP 1. Perform physical hard reset (see WP 0040 00).

STEP 2. Re-install LHMBC software (see WP 0040 00).

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**LHMBC SOFTWARE - Continued****16. SYMPTOM**

LHMBC software fails to start or not responding.

**MALFUNCTION**

Software malfunction or corrupt database.

**CORRECTIVE ACTION**

STEP 1. Perform soft reset (see WP 0040 00) and try to start LHMBC software.

STEP 2. If problem persists, perform a hard reset and re-install LHMBC software (see WP 0040 00).

**17. SYMPTOM**

**Install** not appearing in iPAQ file store.

**MALFUNCTION**

Installation not completely successful or install file manually deleted.

**CORRECTIVE ACTION**

Notify unit maintenance.

**18. SYMPTOM**

Keyboard not responding or missing during LHMBC software use.

**MALFUNCTION**

Software crash.

**CORRECTIVE ACTION**

STEP 1. Perform soft reset (see WP 0040 00) and retry keyboard in LHMBC software.

STEP 2. If problem persists, re-install LHMBC software (see WP 0040 00).

STEP 3. If problem persists, notify unit maintenance.

**19. SYMPTOM**

Audio alarm not working within LHMBC.

**MALFUNCTION**

Audio alarm not enabled.

**CORRECTIVE ACTION**

STEP 1. On Setup Data screen, check audio alarm checkbox and click **Use All**.

STEP 2. If problem persists, continue with next malfunction.

**MALFUNCTION**

Operating system volume level low or muted.

**CORRECTIVE ACTION**

STEP 1. Exit LHMBC software, if necessary.

STEP 2. Click volume icon in taskbar at top of display screen.

STEP 3. Set volume as desired.

STEP 4. If problem persists, continue with next malfunction.

**MALFUNCTION**

Speaker damaged.

**CORRECTIVE ACTION**

STEP 1. Perform self-test on sound to test hardware.

STEP 2. Continue using LHMBC but use visual Alerts. Notify unit maintenance when possible.

**20. SYMPTOM**

Backup, Restore, BIT, Clear Data, Factory Database, or Zeroize GPS failed when run from LHMBC Maintenance screen.

**MALFUNCTION**

Corrupt system database.

**CORRECTIVE ACTION**

STEP 1. Perform soft reset (see WP 0040 00).

STEP 2. If problem persists, perform factory database from LHMBC Maintenance Application (see WP 0040 00). (Note that current data will be lost.)

STEP 3. If problem persists, continue with next malfunction.

**MALFUNCTION**

Corrupt application data.

**CORRECTIVE ACTION**

STEP 1. Re-install LHMBC software (see WP 0040 00).

STEP 2. If problem persists, notify unit maintenance.

---

**LHMBC SOFTWARE - Continued****21. SYMPTOM**

Processing wheel present for more than one minute.

**MALFUNCTION**

Software malfunction.

**CORRECTIVE ACTION**

STEP 1. Perform soft reset (see WP 0040 00).

STEP 2. If problem persists, perform factory database from LHMBC Maintenance Application (see WP 0040 00). (Note that current data will be lost.)

STEP 3. If problem persists, re-install LHMBC software (see WP 0040 00).

STEP 4. If problem persists, notify unit maintenance.

**22. SYMPTOM**

Ballistic solutions on LHMBC and check computer do not match.

**MALFUNCTION**

Data entry mistakes.

**CORRECTIVE ACTION**

Verify Data entry. Verify MET and Use of Registration corrections factors match. If problem persists, continue with next malfunction.

**MALFUNCTION**

LHMBCs have different software versions installed.

**CORRECTIVE ACTION**

Verify software versions by either starting LHMBC Maintenance Application from operating system (click **Start/Maintenance**) or by displaying Status screen in LHMBC software. Both the LHMBC and BK Version numbers must be the same on each computer (e.g., LHMBC Maintenance Application should display “Version V2.1 D3 B1” and “BK Version 1.36” on both LHMBCs and Status screen should display “Version V2.1 D3 B1” and “BK Version 1.36” on both LHMBCs). If versions are not the same, notify unit maintenance.

**23. SYMPTOM**

Unencrypted card message appears.

**MALFUNCTION**

Unit maintenance procedure not completed correctly.

**CORRECTIVE ACTION**

STEP 1. Click **No** to close message box and then click **ok** to close Pointsec security information box.

STEP 2. Continue to use LHMBC. Notify unit maintenance when possible.

---

**HARDWARE****24. SYMPTOM**

Stylus broken or missing.

**MALFUNCTION**

N/A.

**CORRECTIVE ACTION****NOTE**

Do not use any tool in place of stylus that will damage display screen.

Replace stylus.

**25. SYMPTOM**

Touch screen responds inaccurately to screen taps.

**MALFUNCTION**

Misaligned screen.

**CORRECTIVE ACTION**

STEP 1. If possible, perform operating system self-test to re-align screen.

STEP 2. If problem persists, perform physical hard reset (see WP 0040 00) and attempt to re-align screen.

STEP 3. If problem persists, notify unit maintenance.

**26. SYMPTOM**

Backlight not functioning properly.

**MALFUNCTION**

Backlight off.

**CORRECTIVE ACTION**

STEP 1. Hold Sleep button for 2 seconds to toggle backlight.

STEP 2. If problem persists, perform soft reset (see WP 0040 00).

STEP 3. If problem persists, continue with next malfunction.

**MALFUNCTION**

Backlight level too low.

**CORRECTIVE ACTION**

STEP 1. Adjust brightness of backlight (see WP 0005 00).

STEP 2. If problem persists, continue with next malfunction.

**MALFUNCTION**

Backlight broken.

**CORRECTIVE ACTION**

Notify unit maintenance.

---

**HARDWARE - Continued****27. SYMPTOM**

Soft reset not working.

**MALFUNCTION**

Soft Reset button damaged.

**CORRECTIVE ACTION**

Notify unit maintenance.

**28. SYMPTOM**

Hot key button(s) not working.

**MALFUNCTION**

Hot key button(s) damaged.

**CORRECTIVE ACTION**

STEP 1. Perform soft reset (see WP 0040 00) and retry hot key function.

STEP 2. If problem persists, test if four small hot keys generate pop-up window in operating system. If pop-up window is displayed, re-install LHMBC software (see WP 0040 00).

STEP 3. If problem persists, continue operation in degraded mode without use of hot key button(s). Notify unit maintenance when possible.

**MISCELLANEOUS****29. SYMPTOM**

“Unrecognized card in socket” warning in operating system.

**MALFUNCTION**

Expansion pack connections not secure.

**CORRECTIVE ACTION**

STEP 1. Perform up to three soft resets (see WP 0040 00).

STEP 2. If problem persists, remove and securely reconnect expansion pack (see WP 0040 00).

STEP 3. Perform soft reset.

STEP 4. If problem persists, notify unit maintenance.

**30. SYMPTOM**

LHMBC locks up due to extreme temperatures.

**MALFUNCTION**

Main internal battery locked up.

**CORRECTIVE ACTION**

STEP 1. Remove main internal battery for 2-5 seconds.

STEP 2. Re-install main internal battery.

STEP 3. Perform soft reset (see WP 0040 00).

STEP 4. If problem persists, attempt to place LHMBC in moderate environment.

**END OF WORK PACKAGE**

**CHAPTER 4**

**UNIT TROUBLESHOOTING PROCEDURES  
FOR  
LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

## UNIT MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

## UNIT MALFUNCTION/SYMPTOM INDEX

<u>Malfunction/Symptom</u>	<u>Troubleshooting Procedure</u>
<b>M32 LHMBC TROUBLESHOOTING</b>	
<b>Power/Batteries</b>	
1. LHMBC fails to wake up with Sleep button.....	WP 0037 00
2. LHMBC fails to enter Sleep Mode with Sleep button.....	WP 0037 00
3. Battery adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing) .....	WP 0037 00
4. AC adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing) .....	WP 0037 00
5. DC/DC converter and DC power cable fail to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing) .....	WP 0037 00
6. Charging LED not functioning properly .....	WP 0037 00
<b>Global Positioning System (GPS)</b>	
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8. "GPS not functioning" or "GPS not communicating" message displayed on GPS screen .....	WP 0037 00
9. GPS key not loading .....	WP 0037 00
<b>Communications (Commo)</b>	
10. Commo capability not available ( <b>Commo</b> control button not displayed in LHMBC software).....	WP 0037 00
11. Unable to establish digital communications with any other unit (channel enabled successfully).....	WP 0037 00
12. "Enable channel unsuccessful" message appears after clicking <b>Enable Channel</b> .....	WP 0037 00
<b>LHMBC Software</b>	
13. <b>Install</b> not appearing in iPAQ file store .....	WP 0037 00
14. Keyboard not responding or missing during LHMBC software use .....	WP 0037 00
15. Audio alarm not working within LHMBC .....	WP 0037 00
16. Backup, Restore, BIT, Clear Data, Factory Database, or Zeroize GPS failed when run from LHMBC Maintenance screen .....	WP 0037 00



**Malfunction/Symptom****Troubleshooting Procedure****LHMBC Software - Continued**

17. Processing wheel present for more than one minute.....	WP 0037 00
18. Ballistic solutions on LHMBC and check computer do not match.....	WP 0037 00
19. Unencrypted card message appears .....	WP 0037 00

**Hardware**

20. Touch screen responds inaccurately to screen taps .....	WP 0037 00
21. Backlight not functioning properly .....	WP 0037 00
22. Soft reset not working .....	WP 0037 00
23. Hot key button(s) not working .....	WP 0037 00

**Miscellaneous**

24. "Unrecognized card in socket" warning in operating system .....	WP 0037 00
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**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****UNIT TROUBLESHOOTING PROCEDURES**

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**INITIAL SETUP:****References**

WP 0040 00

WP 0043 00

**NOTE**

See WP 0058 00 for warranty procedure.

**Equipment Conditions**

Troubleshooting Introduction (WP 0033 00)

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**POWER/BATTERIES****1. SYMPTOM**

LHMBC fails to wake up with Sleep button.

**MALFUNCTION**

Sleep button broken.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**MALFUNCTION**

Main internal battery dormant.

**CORRECTIVE ACTION**

STEP 1. Exchange dormant main internal battery with charged main internal battery.

STEP 2. Attempt to revive dormant battery by charging it. If main internal battery does not revive after 5 days, execute warranty procedure, if applicable.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**2. SYMPTOM**

LHMBC fails to enter Sleep Mode with Sleep button.

**MALFUNCTION**

Sleep button damaged or broken.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

---

**POWER/BATTERIES - Continued****3. SYMPTOM**

Battery adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing).

**MALFUNCTION**

Battery adapter and/or AA battery holder faulty.

**CORRECTIVE ACTION**

STEP 1. Determine faulty hardware by performing functional test (see WP 0040 00) and electrical test (see WP 0043 00) on each item.

STEP 2. Replace faulty hardware item.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**4. SYMPTOM**

AC adapter fails to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing).

**MALFUNCTION**

AC adapter and/or basic digital computer faulty.

**CORRECTIVE ACTION**

STEP 1. Determine faulty hardware by performing functional test (see WP 0040 00) and electrical test (see WP 0043 00) on AC adapter.

STEP 2. Replace faulty hardware item. If applicable, execute warranty procedure.

**5. SYMPTOM**

DC/DC converter and DC power cable fail to charge LHMBC internal batteries (operating system or LHMBC software not indicating external power present, LED not blinking, or power levels not increasing).

**MALFUNCTION**

DC power cable, DC/DC converter, or LHMBC damaged.

**CORRECTIVE ACTION**

STEP 1. Determine faulty hardware by performing functional test (see WP 0040 00) and electrical test (see WP 0043 00).

STEP 2. Replace faulty hardware item. If applicable, execute warranty procedure.

**6. SYMPTOM**

Charging LED not functioning properly.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

---

**GLOBAL POSITIONING SYSTEM (GPS)****7. SYMPTOM**

GPS capability not available (GPS control button not displayed in LHMBC software).

**MALFUNCTION**

LHMBC basic computer or expansion pack faulty.

**CORRECTIVE ACTION**

STEP 1. Replace expansion pack with known working expansion pack (see WP 0040 00).

STEP 2. If this solves the problem, the expansion pack was faulty. Execute warranty procedure.

STEP 3. If problem persists, LHMBC basic computer is faulty. Execute warranty procedure.

**8. SYMPTOM**

“GPS not functioning” or “GPS not communicating” message displayed on GPS screen.

**MALFUNCTION**

Imbedded GPS card in expansion pack faulty.

**CORRECTIVE ACTION**

Replace expansion pack with known working expansion pack (see WP 0040 00). If applicable, execute warranty procedure.

**9. SYMPTOM**

GPS key not loading.

**MALFUNCTION**

Imbedded GPS card in expansion pack faulty.

**CORRECTIVE ACTION**

STEP 1. Verify fill device is working properly.

STEP 2. Replace expansion pack with known working expansion pack (see WP 0040 00). If applicable, execute warranty procedure.

**COMMUNICATIONS (COMMO)****10. SYMPTOM**

Commo capability not available (Commo control button not displayed in LHMBC software).

**MALFUNCTION**

Modem card loose or faulty.

**CORRECTIVE ACTION**

STEP 1. Remove and reseat modem card in expansion pack (see WP 0040 00). If problem is fixed, modem card was loose.

STEP 2. If problem persists, replace modem card in expansion pack (see WP 0043 00). If problem is fixed, modem card was damaged. If applicable, execute warranty procedure.

STEP 3. If problem persists, continue with next malfunction.

**COMMUNICATIONS (COMMO) - Continued****MALFUNCTION**

Basic digital computer or expansion pack faulty.

**CORRECTIVE ACTION**

STEP 1. Replace basic digital computer. If problem is fixed, basic digital computer was damaged. If applicable, execute warranty procedure.

STEP 2. If problem persists, expansion pack is damaged. Replace expansion pack. If applicable, execute warranty procedure.

**11. SYMPTOM**

Unable to establish digital communications with any other unit (channel enabled successfully).

**MALFUNCTION**

Radio cable faulty.

**CORRECTIVE ACTION**

STEP 1. Perform electrical test on radio cable (see WP 0043 00). If faulty, replace radio cable. If problem is fixed, radio cable was damaged.

STEP 2. If problem persists, continue with next malfunction.

**MALFUNCTION**

Modem card loose or faulty.

**CORRECTIVE ACTION**

STEP 1. Remove and reseat modem card in expansion pack (see WP 0040 00). If problem is fixed, modem card was loose.

STEP 2. If problem persists, replace modem card in expansion pack (see WP 0043 00). If problem is fixed, modem card was damaged. If applicable, execute warranty.

**12. SYMPTOM**

“Enable channel unsuccessful” message appears after clicking **Enable Channel**.

**MALFUNCTION**

Modem card loose or faulty.

**CORRECTIVE ACTION**

STEP 1. Remove and reseat modem card in expansion pack (see WP 0040 00). If problem is fixed, modem card was loose.

STEP 2. If problem persists, replace modem card in expansion pack (see WP 0043 00). If problem is fixed, modem card was damaged. If applicable, execute warranty procedure.

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**LHMBC SOFTWARE****13. SYMPTOM**

Install not appearing in iPAQ file store.

**MALFUNCTION**

Installation not completely successful or install file manually deleted.

**CORRECTIVE ACTION**

Install LHMBC software using SD card (see WP 0043 00).

**14. SYMPTOM**

Keyboard not responding or missing during LHMBC software use.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**15. SYMPTOM**

Audio alarm not working within LHMBC.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**16. SYMPTOM**

Backup, Restore, BIT, Clear Data, Factory Database, or Zeroize GPS failed when run from LHMBC Maintenance screen.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**17. SYMPTOM**

Processing wheel present for more than one minute.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

---

**LHMBC SOFTWARE - Continued****18. SYMPTOM**

Ballistic solutions on LHMBC and check computer do not match.

**MALFUNCTION**

LHMBCs have different software versions installed.

**CORRECTIVE ACTION**

Use the SD card to install same software versions on all LHMBCs (see WP 0043 00).

**19. SYMPTOM**

Unencrypted card message appears.

**MALFUNCTION**

SD card left in SD slot.

**CORRECTIVE ACTION**

STEP 1. Remove SD card (see WP 0043 00).

STEP 2. Replace SD cover and sticker.

**HARDWARE****20. SYMPTOM**

Touch screen responds inaccurately to screen taps.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**21. SYMPTOM**

Backlight not functioning properly.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**22. SYMPTOM**

Soft reset not working.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

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**HARDWARE - Continued****23. SYMPTOM**

Hot key button(s) not working.

**MALFUNCTION**

Basic digital computer faulty.

**CORRECTIVE ACTION**

Replace basic digital computer. If applicable, execute warranty procedure.

**MISCELLANEOUS****24. SYMPTOM**

“Unrecognized card in socket” warning in operating system.

**MALFUNCTION**

Basic digital computer or expansion pack faulty.

**CORRECTIVE ACTION**

STEP 1. Replace basic digital computer. If problem is fixed, basic digital computer was damaged. If applicable, execute warranty procedure.

STEP 2. If problem persists, expansion pack is damaged. Replace expansion pack. If applicable, execute warranty procedure.

**END OF WORK PACKAGE**



## **CHAPTER 5**

# **OPERATOR MAINTENANCE INSTRUCTIONS FOR LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS) INTRODUCTION**

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**INITIAL SETUP:****References**

DA PAM 738-750

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**GENERAL**

Preventive Maintenance Checks and Services (PMCS) must be performed by the operator to be sure the M32 LHMBC is in good operating condition and ready for its primary mission.

To ensure maximum operational readiness, it is necessary that the M32 LHMBC be inspected at regular intervals so that any defects can be discovered and corrected before serious damage or failure occurs.

Always observe the WARNINGS and CAUTIONS before and during operation. A WARNING means someone could be hurt. A CAUTION means equipment could be damaged. If the equipment fails to operate, troubleshoot. Report any deficiencies using the proper forms. See DA PAM 738-750.

**EXPLANATION OF COLUMNS IN THE PMCS TABLE**

1. Item Number Column - Numbers in this column are for reference. Item numbers appear in the order in which checks and services must be performed for the intervals listed.
2. Interval Column - This column tells you when each check is to be performed in the procedure column. "Before" procedures must be done before the equipment is used for its intended mission. "During" procedures must be done during the time the equipment is being used for its intended mission. "After" procedures must be done immediately after you have operated or used the equipment. "Monthly" procedures must be done once a month.
3. Man-hour Column - This column gives the man-hours required to complete all prescribed lubrication services.
4. Item To Be Checked or Serviced Column - This column lists the item to be checked or serviced.
5. Procedure Column - This column gives the procedure you must do to check or service the item listed in the Item To Be Checked or Serviced column to know if the equipment is ready or available for its intended mission or for operation. You must do the procedure at the time stated in the interval column.
6. Equipment Not Ready/Available If: Column - Information in this column tells you what faults will keep your equipment from being capable of performing its primary mission. If applicable, following Equipment Not Ready/Available If: condition is a suggested remedy that will correct the discovered discrepancy. Follow standard operating procedures for maintaining the equipment or reporting equipment failure. Report any malfunctions or failures on DA Form 2404 or refer to DA PAM 738-750.

## OPERATOR MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

## OPERATOR PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

## INITIAL SETUP:

## Materials/Parts

Batteries, alkaline, lithium, or NiMH (WP 0054 00)

Cloth (WP 0054 00)

## References

WP 0034 00

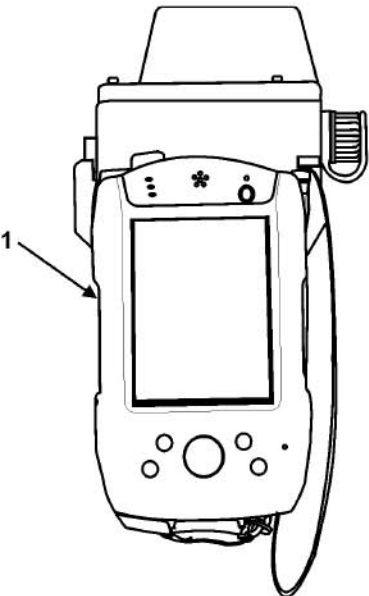
WP 0040 00

## Equipment Conditions

PMCS Introduction (WP 0038 00)

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC

Table 1. Operator PMCS for M32 LHMBC .

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
1	Before		LHMBC with Expansion Pack	<p><b><u>CAUTION</u></b></p> <p>To prevent equipment damage, clean M32 LHMBC components using a soft, lint-free cloth dampened only with water.</p> <ol style="list-style-type: none"> <li>Inspect exterior case (1) for dents, cracks, holes, corrosion, dirt, oil, or grease. Clean exterior case as necessary.</li> </ol> 	Exterior case is dented, cracked, punctured, or corroded to extent it is incapable of providing environmental protection to interior circuitry. Notify unit maintenance.

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued

Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			LHMBC with Expansion Pack - Continued	<ol style="list-style-type: none"> <li>2. Inspect exterior case (1) for loose, missing, bent, or broken screws.</li> <li>3. Inspect connector covers (2) and SD cover (3) for cracks or tears and ensure a proper fit. Inspect lanyards (4) for fraying or breaks.</li> <li>4. Inspect external power connector (5) for damage or corrosion. Ensure connector covers (2) and SD cover (3) are placed over connectors not being used.</li> <li>5. Inspect display screen (6) for cracks, dust, or any foreign matter. Clean as required.</li> <li>6. Ensure stylus (7) is present.</li> </ol>	<p>Screw is missing, bent, or broken. Notify unit maintenance.</p> <p>Connector cover or protective plug does not fit properly. Notify unit maintenance.</p> <p>Connector is damaged or corroded. Notify unit maintenance.</p> <p>Screen is damaged to extent of being unusable. Notify unit maintenance.</p> <p>Stylus is missing and no appropriate tool is available. Replace stylus.</p>

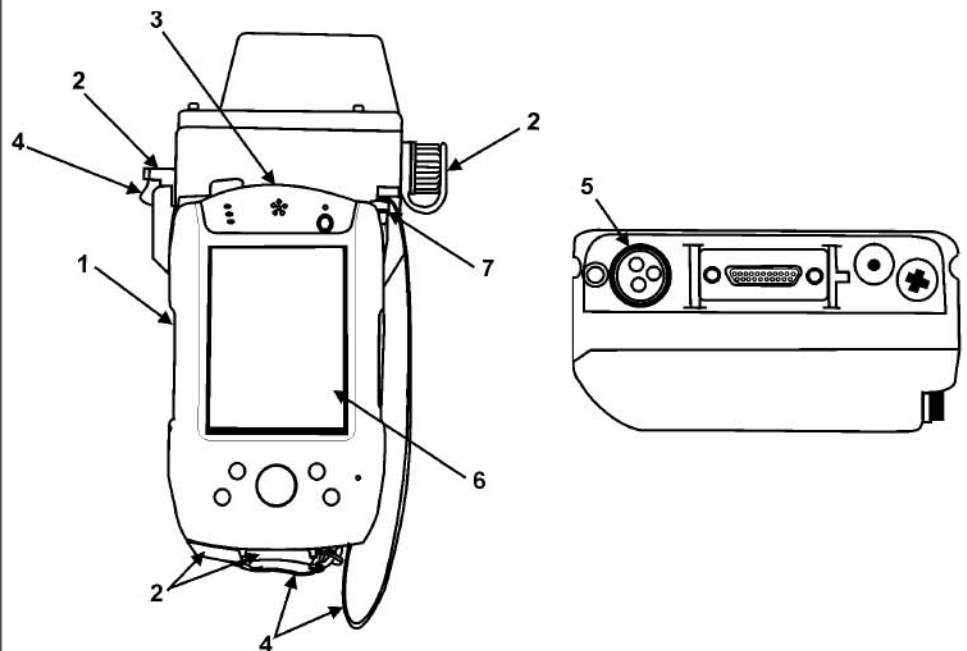
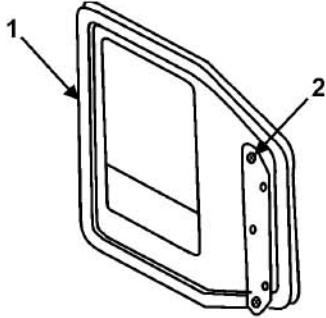
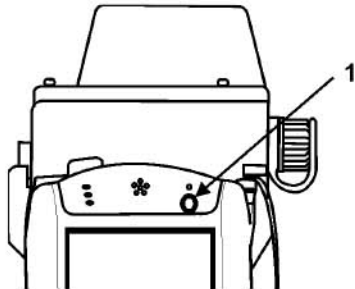


Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
2	Before		Protective Cover Assembly	<ol style="list-style-type: none"> <li>1. Ensure protective cover assembly (1) is properly attached to LHMBC. Inspect protective cover for dirt, oil, or grease. Clean as necessary.</li> <li>2. Inspect for loose, missing, bent, or broken screws (2).</li> </ol> 	<p>Protective cover assembly cannot be properly attached to LHMBC. Notify unit maintenance.</p> <p>Screw is missing, bent, or broken. Notify unit maintenance.</p>
3	Before		LHMBC Power	<p>Press Sleep button (1) to turn on LHMBC. Check battery power (see WP 0040 00).</p> 	<p>Main internal battery is low. If main internal battery is low, charge main internal battery if time permits (see WP 0040 00). Replace main internal battery if it is defective (see WP 0045 00).</p>

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued

Table 1. Operator PMCS for M32 LHMBC - Continued.

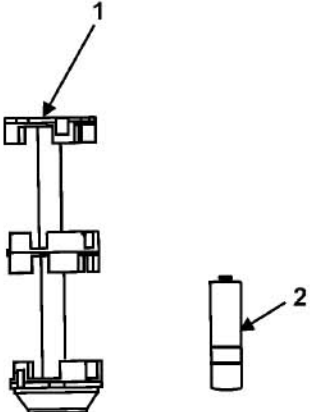
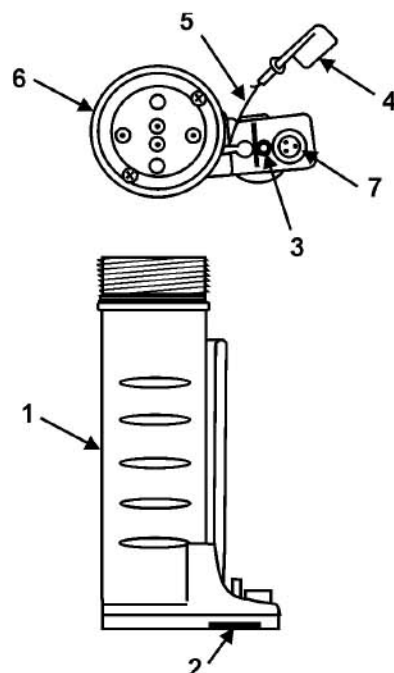
ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
4	Before		Battery Holder	<p><b><u>WARNING</u></b></p> <p>Lithium batteries are potentially hazardous if misused or tampered with. To prevent injury to personnel or equipment damage, the batteries should not be heated, crushed, punctured, mutilated, opened, disassembled, short circuited, recharged, or used under conditions exceeding the operational condition. If heated or disposed in a fire, lithium batteries can explode. Do not mix or use different types of batteries. Do not mix used and new batteries.</p> <p><b><u>CAUTION</u></b></p> <p>Do not use the stylus to remove the batteries from the battery holder. The stylus may break.</p> <ol style="list-style-type: none"> <li>1. Inspect battery holder (1) for damage, corrosion, or cell leakage. Clean as necessary.</li> <li>2. Check to see that AA batteries (2) are present and inserted properly.</li> </ol> 	<p>Battery holder is damaged or corroded. Notify unit maintenance.</p> <p>AA battery is missing. Replace missing AA batteries.</p>

Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
5	Before		Battery Adapter	<ol style="list-style-type: none"> <li>1. Inspect battery adapter housing (1) (exterior and interior) for damage, corrosion, or cell leakage. Clean as necessary.</li> <li>2. Inspect for deformed, damaged, bent, broken, missing, or corroded screw (2) or preformed packing (3).</li> <li>3. Inspect exterior connector cover (4) for cracks or tears and ensure a proper fit. Inspect lanyard (5) for fraying or breaks.</li> <li>4. Inspect interior connector (6) and exterior connector (7) for deformed, damaged, bent, broken, jammed, missing, or corroded pins. Ensure connector cover (4) is inserted on exterior connector (7) if not being used.</li> </ol>	<p>Housing damaged or corroded. Notify unit maintenance.</p> <p>Screw or preformed packing is deformed, damaged, bent, broken, missing, or corroded. Notify unit maintenance.</p> <p>Connector cover does not fit properly. Notify unit maintenance.</p> <p>Connector pin is deformed, damaged, bent, broken, jammed, missing, or corroded. Notify unit maintenance.</p>



## PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued

Table 1. Operator PMCS for M32 LHMBC - Continued.

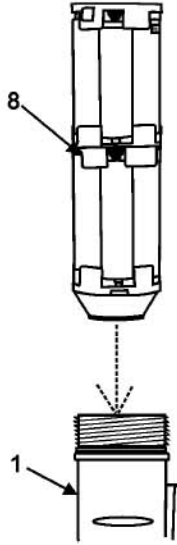
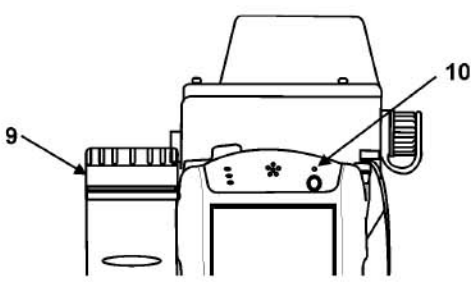
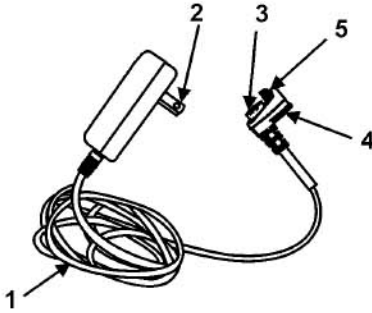
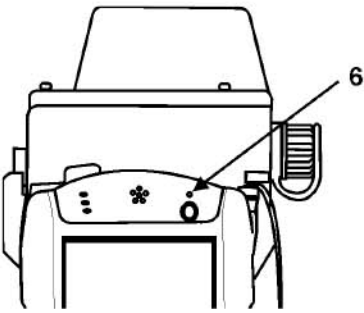
ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
			Battery Adapter - Continued	<p>5. Ensure battery holder (8) is properly inserted in battery adapter (1) (tapered end first).</p>  <p>6. Inspect cap (9) to ensure it can be fully seated onto housing.</p> <p>7. Attach battery adapter to LHMBC (see WP 0040 00) to ensure battery adapter charges LHMBC internal batteries (power indicator (10) displays flashing or solid light).</p> 	<p>Battery holder is improperly inserted. Properly insert battery holder.</p> <p>Cap cannot be fully seated onto housing. Notify unit maintenance.</p> <p>Battery adapter fails to charge LHMBC internal batteries. Perform troubleshooting procedures (see WP 0034 00).</p>



Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
6	Before		AC Power Adapter	<ol style="list-style-type: none"> <li>1. Inspect cable (1) for exposed wires or fraying.</li> <li>2. Inspect for deformed, damaged, bent, broken, jammed, missing, or corroded plug (2), connector pins (3), screw (4), or preformed packing (5).</li> </ol>  <ol style="list-style-type: none"> <li>3. Attach AC power adapter to LHMBC (see WP 0040 00) to ensure AC power adapter charges LHMBC internal batteries (power indicator (6) displays flashing or solid light).</li> </ol> 	<p>Cable has exposed wires or fraying. Notify unit maintenance.</p> <p>Plug, connector pin, screw, or preformed packing is deformed, damaged, bent, broken, jammed, missing or corroded. Notify unit maintenance.</p> <p>AC power adapter fails to charge LHMBC internal batteries. Perform troubleshooting procedures (see WP 0034 00).</p>

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued

Table 1. Operator PMCS for M32 LHMBC - Continued.

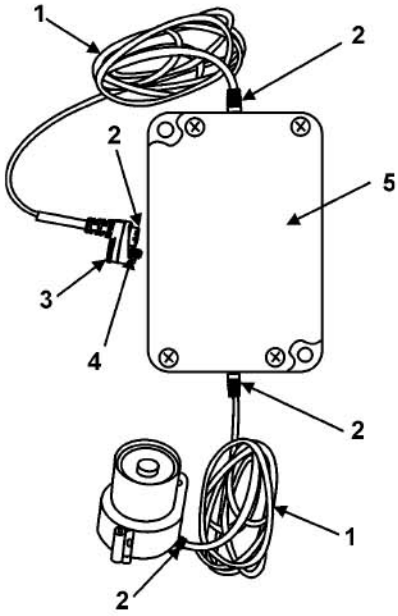
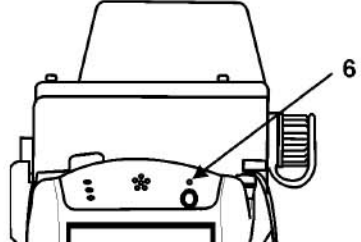
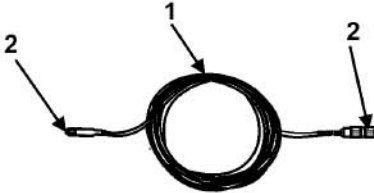
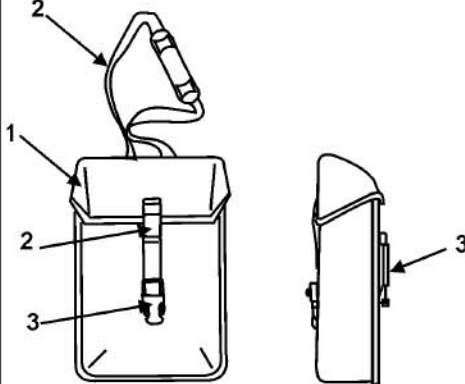
ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
7	Before		NATO Cable Kit	<ol style="list-style-type: none"> <li>Inspect cables (1) for exposed wires or fraying.</li> <li>Inspect for deformed, damaged, bent, broken, jammed, missing, or corroded connectors/connector pins (2), screw (3), or preformed packing (4).</li> <li>Inspect box (5) for loose, missing, bent, or broken screws.</li> </ol>  <ol style="list-style-type: none"> <li>Attach NATO cable kit to LHMBC (see WP 0040 00) to ensure NATO cable kit charges LHMBC internal batteries (power indicator (6) displays flashing or solid light.)</li> </ol> 	<p>Cables have exposed wires or fraying. Notify unit maintenance.</p> <p>Connector, connector pin, screw, or preformed packing is deformed, damaged, bent, broken, jammed, missing or corroded. Notify unit maintenance.</p> <p>Screw is missing, bent, or broken. Notify unit maintenance.</p> <p>NATO cable kit fails to charge LHMBC internal batteries. Perform troubleshooting procedures (see WP 0034 00).</p>

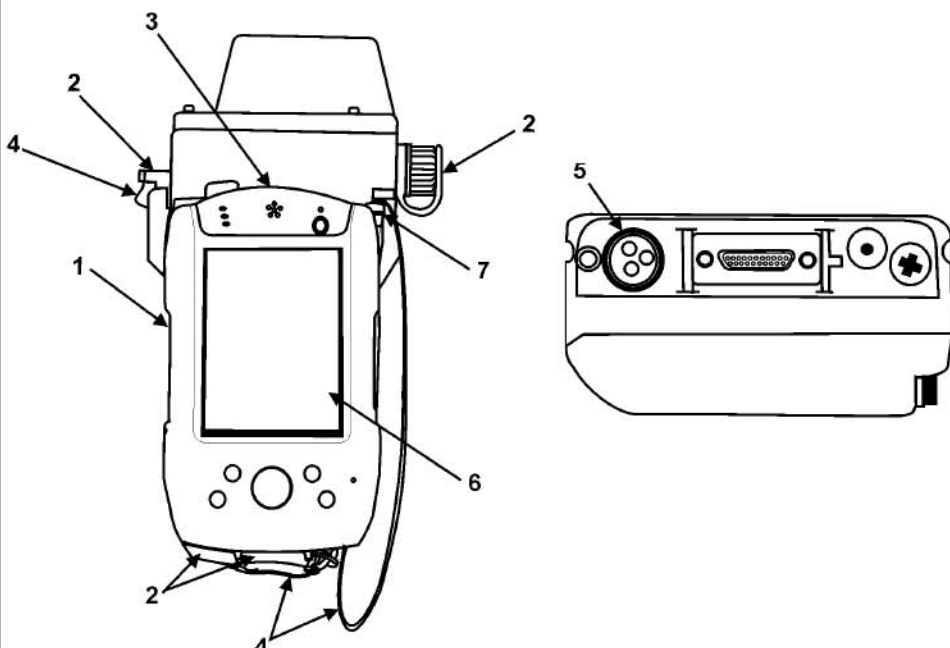
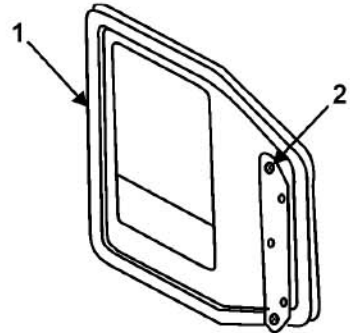
Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
8	Before		Radio Cable	<ol style="list-style-type: none"> <li>1. Inspect cable (1) for exposed wires or fraying.</li> <li>2. Inspect for deformed, damaged, bent, broken, jammed, missing, or corroded connectors/connector pins (2).</li> </ol> 	<p>Cable has exposed wires or fraying. Notify unit maintenance.</p> <p>Connector or connector pin is deformed, damaged, bent, broken, jammed, missing or corroded. Notify unit maintenance.</p>
9	Before		Battery Holder Stickers, Battery Adapter Sticker, LED Blackout Sticker, SD Cover Sticker, and NVG Filter	Inspect battery holder stickers, battery adapter sticker, LED blackout sticker, SD cover sticker, and NVG filter for tears or wrinkles.	Stickers and/or filters torn or wrinkled to extent of being incapable of properly attaching to LHMBC. Notify unit maintenance.
10	Before		Soft Field Case	<p>Inspect case (1) for tears or holes.</p> <p>Inspect straps (2) and fasteners (3) for security and serviceability.</p> 	Case is damaged to extent of being incapable of providing protection for the LHMBC. Notify unit maintenance.

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued****Table 1. Operator PMCS for M32 LHMBC - Continued.**

<b>ITEM NO.</b>	<b>INTERVAL</b>	<b>MAN-HOUR</b>	<b>ITEM TO BE CHECKED OR SERVICED</b>	<b>PROCEDURE</b>	<b>EQUIPMENT NOT READY/ AVAILABLE IF:</b>
11	Before		LHMBC Software	<ol style="list-style-type: none"> <li>1. Ensure software program is operational.</li> <li>2. Perform virus scan (see WP 0040 00).</li> </ol>	Virus is detected. Notify unit maintenance.
12	During		Battery Holder Stickers, Battery Adapter Sticker, LED Blackout Sticker, SD Cover Sticker, and NVG Filter	Inspect battery holder stickers, battery adapter sticker, LED blackout sticker, SD cover sticker, and NVG filter for tears or wrinkles.	Stickers and/or filters torn or wrinkled to extent of being incapable of properly attaching to LHMBC. Notify unit maintenance.
13	During		LHMBC Software	Perform BIT (see WP 0040 00).	BIT failed. Notify unit maintenance.
14	After		LHMBC with Expansion Pack	<ol style="list-style-type: none"> <li>1. Inspect exterior case (1) for dents, cracks, holes, corrosion, dirt, oil, or grease. Clean exterior case as necessary.</li> <li>2. Inspect exterior case (1) for loose, missing, bent, or broken screws.</li> <li>3. Inspect connector covers (2) and SD cover (3) for cracks or tears and ensure a proper fit. Inspect lanyards (4) for fraying or breaks.</li> <li>4. Inspect external power connector (5) for damage or corrosion. Ensure connector covers (2) and SD cover (3) are placed over connectors.</li> </ol>	<p>Exterior case is dented, cracked, punctured, or corroded to extent it is incapable of providing environmental protection to interior circuitry. Notify unit maintenance.</p> <p>Screw is missing, bent, or broken. Notify unit maintenance.</p> <p>Connector cover or protective plug does not fit properly. Notify unit maintenance.</p> <p>Connector is damaged or corroded. Notify unit maintenance.</p>

Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
				<div>5. Inspect display screen (6) for cracks, dust, or any foreign matter. Clean as required.</div> <div>6. Ensure stylus (7) is present.</div> <div></div>	<div>Screen is damaged to extent of being unusable. Notify unit maintenance.</div> <div>Stylus is missing. Replace stylus.</div>
15	After		Protective Cover Assembly	<div>1. Ensure protective cover assembly (1) is properly attached to LHMBC. Inspect protective cover for dirt, oil, or grease. Clean as necessary.</div> <div>2. Inspect for loose, missing, bent, or broken screws (2).</div> <div></div>	<div>Protective cover assembly cannot be properly attached to LHMBC. Notify unit maintenance.</div> <div>Screw is missing, bent, or broken. Notify unit maintenance.</div>

## PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued

Table 1. Operator PMCS for M32 LHMBC - Continued.

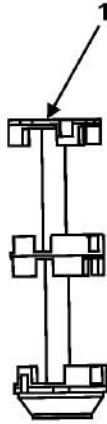
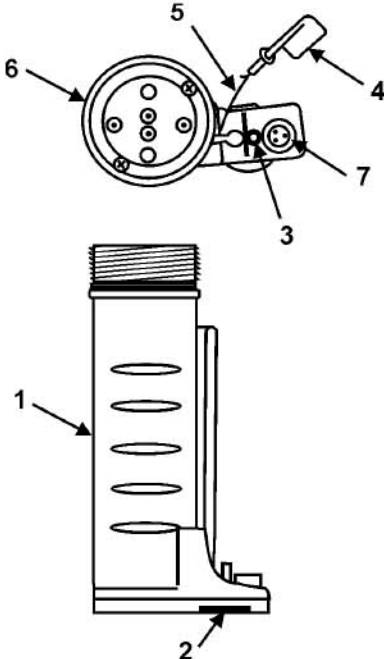
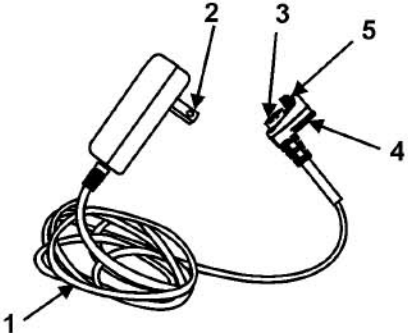
ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
16	After		Battery Holder	<p><b>CAUTION</b></p> <p>Do not use the stylus to remove the batteries from the battery holder. The stylus may break.</p> <p>Inspect battery holder (1) for damage, corrosion, or cell leakage. Clean as necessary.</p> 	Battery insert is damaged, corroded, or shows signs of cell leakage. Notify unit maintenance.
17	After		Battery Adapter	<p>1. Inspect battery adapter housing (1) (exterior and interior) for damage, corrosion, or cell leakage. Clean as necessary.</p> 	Housing damaged, corroded, or shows signs of cell leakage. Notify unit maintenance.

Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
18	After		AC Power Adapter	<ol style="list-style-type: none"> <li>Inspect for deformed, damaged, bent, broken, missing, or corroded screw (2) or preformed packing (3).</li> <li>Inspect exterior connector cover (4) for cracks or tears and ensure a proper fit. Inspect lanyard (5) for fraying or breaks.</li> <li>Inspect interior connector (6) and exterior connector (7) for deformed, damaged, bent, broken, jammed, missing, or corroded pins. Ensure connector cover (4) is inserted on exterior connector (7).</li> <li>Inspect cable (1) for exposed wires or fraying.</li> <li>Inspect for deformed, damaged, bent, broken, jammed, missing, or corroded plug (2), connector pins (3), screw (4), or preformed packing (5).</li> </ol> 	<p>Screw or preformed packing is deformed, damaged, bent, broken, missing, or corroded. Notify unit maintenance.</p> <p>Connector cover does not fit properly. Notify unit maintenance.</p> <p>Connector pin is deformed, damaged, bent, broken, jammed, missing, or corroded. Notify unit maintenance.</p> <p>Cable has exposed wires or fraying. Notify unit maintenance.</p> <p>Plug, connector pin, screw, or preformed packing is deformed, damaged, bent, broken, jammed, missing or corroded. Notify unit maintenance.</p>

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued****Table 1. Operator PMCS for M32 LHMBC - Continued.**

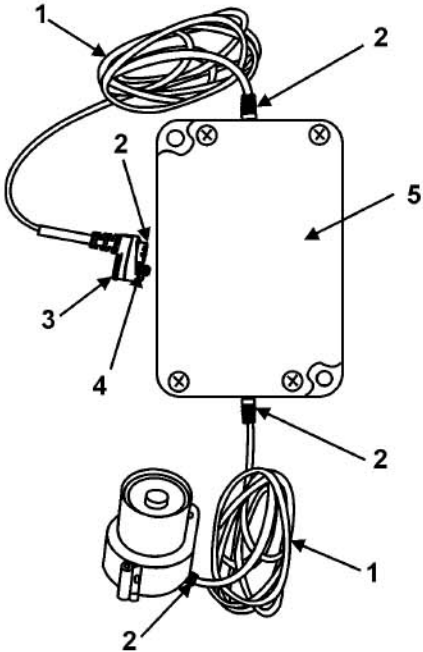
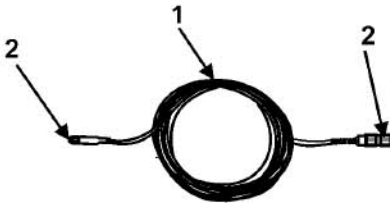
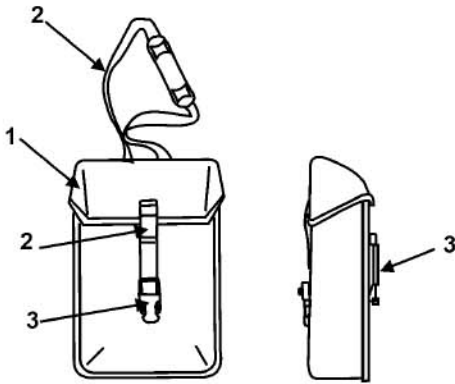
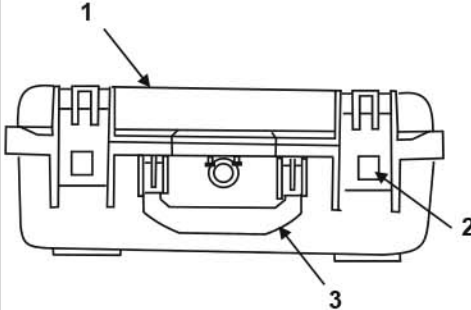
ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
19	After		NATO Cable Kit	<ol style="list-style-type: none"> <li>1. Inspect cables (1) for exposed wires or fraying</li> <li>2. Inspect for deformed, damaged, bent, broken, jammed, missing, or corroded connectors/connector pins (2), screw (3), or preformed packing (4).</li> <li>3. Inspect box (5) for loose, missing, bent, or broken screws.</li> </ol> 	<p>Cables have exposed wires or fraying. Notify unit maintenance.</p> <p>Connector, connector pin, screw, or preformed packing is deformed, damaged, bent, broken, jammed, missing or corroded. Notify unit maintenance.</p> <p>Screw is missing, bent, or broken. Notify unit maintenance.</p>



Table 1. Operator PMCS for M32 LHMBC - Continued.

ITEM NO.	INTERVAL	MAN-HOUR	ITEM TO BE CHECKED OR SERVICED	PROCEDURE	EQUIPMENT NOT READY/ AVAILABLE IF:
20	Before		Radio Cable	<ol style="list-style-type: none"> <li>1. Inspect cable (1) for exposed wires or fraying.</li> <li>2. Inspect for deformed, damaged, bent, broken, jammed, missing, or corroded connectors/connector pins (2).</li> </ol> 	<p>Cable has exposed wires or fraying. Notify unit maintenance.</p> <p>Connector or connector pin is deformed, damaged, bent, broken, jammed, missing or corroded. Notify unit maintenance.</p>
21	After		Battery Holder Stickers, Battery Adapter Sticker, LED Blackout Sticker, SD Cover Sticker, and NVG Filter	Inspect battery holder stickers, battery adapter sticker, LED blackout sticker, SD cover sticker, and NVG filter for tears or wrinkles.	Stickers and/or filters torn or wrinkled to extent of being incapable of properly attaching to LHMBC. Notify unit maintenance.
22	After		Soft Field Case	<p>Inspect case (1) for tears or holes.</p> <p>Inspect straps (2) and fasteners (3) for security and serviceability.</p> 	Case is damaged to extent of being incapable of providing protection for the LHMBC. Notify unit maintenance.

**PREVENTIVE MAINTENANCE CHECKS AND SERVICES FOR M32 LHMBC - Continued****Table 1. Operator PMCS for M32 LHMBC - Continued.**

<b>ITEM NO.</b>	<b>INTERVAL</b>	<b>MAN-HOUR</b>	<b>ITEM TO BE CHECKED OR SERVICED</b>	<b>PROCEDURE</b>	<b>EQUIPMENT NOT READY/ AVAILABLE IF:</b>
23	After		Shipping Hard Case	<p>Inspect case (1) for dents, cracks, holes, corrosion, dirt, oil, or grease. Inspect fasteners (2) and handle (3) for security and serviceability. Clean case as necessary.</p> 	Case is damaged to point of being incapable of providing protection for the LHMBC. Notify unit maintenance.
24	Monthly		LHMBC Software	Perform virus scan (see WP 0040 00).	Virus is detected. Notify unit maintenance.

**END OF WORK PACKAGE**

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**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****OPERATOR MAINTENANCE PROCEDURES**

---

**INITIAL SETUP:****Tools and Special Tools**

Screwdriver (WP 0052 00, BII)

**References**

WP 0034 00

WP 0053 00

**Materials/Parts**

Batteries, alkaline, lithium, or NiMH (WP 0054 00)

Cloth (WP 0054 00)

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**GENERAL****CAUTION**

Do not use any cleaning solvent on the LHMBC that may damage the display screen.

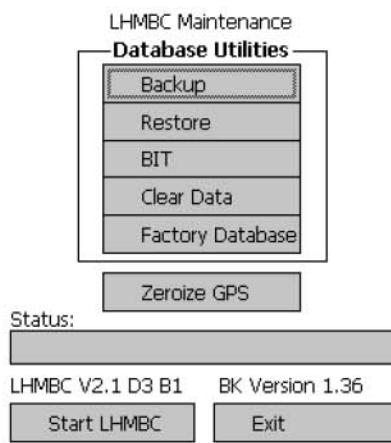
This work package provides information on the LHMBC Maintenance Application and procedures for recharging the LHMBC internal batteries, resetting the LHMBC, re-installing the LHMBC software, operating system settings, performing a self test, performing a virus scan, changing the password, removing the LHMBC back, removing the expansion pack protective cover, removing/reinstalling the expansion pack, replacing/resetting the LHMBC internal battery, and cleaning the M32 LHMBC components.

**LHMBC MAINTENANCE APPLICATION**

LHMBC Maintenance Application provides the means to backup and restore stored data, run a Built-In-Test (BIT), return the security mode to unclassified, perform a factory database, zeroize GPS, verify the latest installed LHMBC software, and initialize the LHMBC software.

**LHMBC Maintenance Screen**

1. To run the LHMBC Maintenance Application, click **Start/Maintenance** from the operating system.



## LHMBC MAINTENANCE APPLICATION - Continued

### LHMBC Maintenance Screen - Continued

#### NOTE

**Backup** should be used to save data prior to re-installing LHMBC software, performing a hard reset, changing main internal battery, or putting LHMBC in storage.

Digitally received or sent messages, PTMs, classified data, and any MET that has not been applied will NOT be stored (backed up).

**BIT** should be run before running **Backup**.

- a. **Backup** stores data that has been entered and saved in file system. The LHMBC database will create a file which will store current LHMBC data (e.g., Geographical References, Unit List, Ammunition, Registration Points, Targets/ Known Points, Safety Fan, and/or MET) that has been entered and saved. Any previously backed up data will be overwritten. Backed up data will not be erased with a hard reset or if the main and backup batteries go completely dead. The backed up data is available for use by clicking the **Restore** control button.

#### CAUTION

**Restore** should be used after re-installing LHMBC software or performing a hard reset to restore previously backed up data. **Restore WILL OVERWRITE ALL CURRENT DATA.**

- b. **Restore** restores data previously backed-up using the **Backup** control button. A confirmation box is displayed showing the date and time the database being restored was previously backed up. If a database was not previously backed up, an error message will be displayed ("NO BACKUP COPY EXISTS"). After restoring the data, start the LHMBC software and verify the restored data is still accurate (e.g., Geographical References, Unit List, Ammunition, Registration Points, Targets/Known Points, Safety Fan, and/or MET).
- c. **BIT** runs a Built-In-Test on the LHMBC database to ensure the database is not corrupt. If the test is successful a green check mark appears on the BIT control button (if the LHMBC Maintenance Application is closed and then re-opened, the green check mark disappears). If the test fails, see troubleshooting (WP 0034 00).
- d. **Clear Data** clears all classified information and resets the security mode to UNCLASSIFIED, if the LHMBC was set to handle classified information (SECRET or CONFIDENTIAL). Current unclassified data in the database or backed up data will NOT be cleared. After the security mode clears, a soft reset is automatically performed.
- e. **Factory Database** installs the original LHMBC database. Current data stored in the database will be lost (e.g., Geographical References, Unit List, Ammunition, Registration Points, Targets/Known Points, Safety Fan, MET, digitally received or sent messages, and/or PTMs). If the database was backed up prior to installing the factor database, it will be available to restore.
- f. **Zerioze GPS** deletes GPS fill.
- g. **Status** displays a progress bar when **Backup**, **Restore**, **BIT**, **Clear Data**, or **Factory Database** is processing.
- h. The LHMBC software version, drop and build (e.g., **LHMBC V2.1 D3 B1**) and the Ballistic Kernel (BK) version (e.g., **BK Version 1.36**) are displayed. This information may be needed for troubleshooting software problems, to be included on trouble reports, and to verify the latest installed LHMBC software.
- i. **Start LHMBC** enters the LHMBC software.

## RECHARGING LHMBC INTERNAL BATTERIES

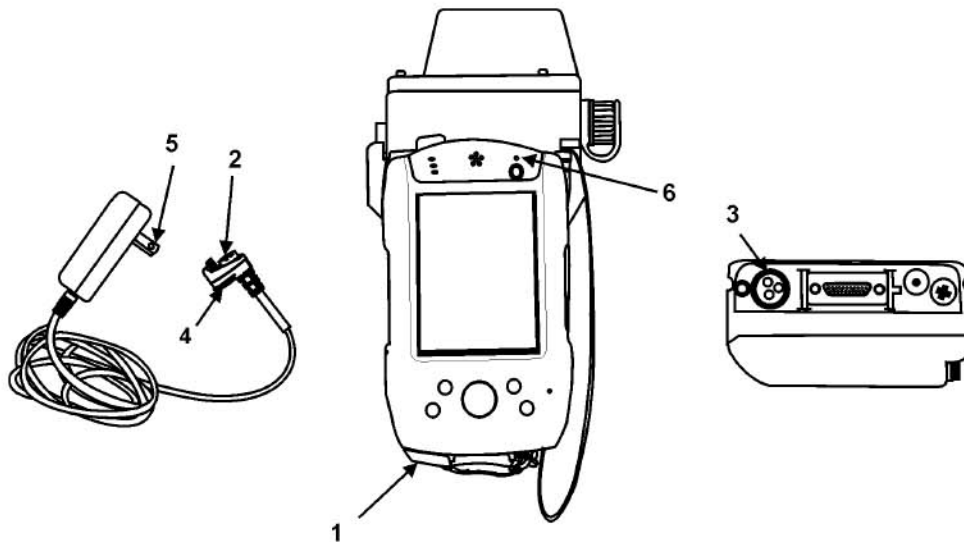
### NOTE

The LHMBC software will have to be re-installed and any saved data re-entered or restored if the internal batteries completely discharge.

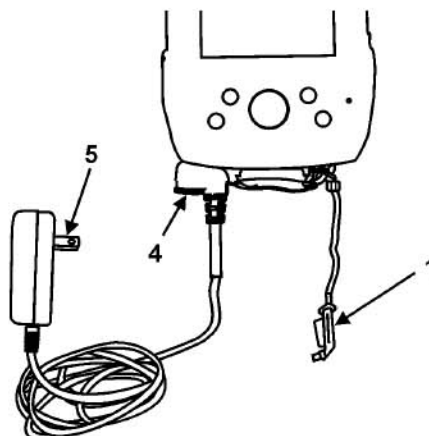
It is recommended to charge the LHMBC internal batteries using the AC or DC power adapters as often as possible to conserve AA battery usage.

### Using AC Power Adapter

1. Remove the external power connector cover (1) from the LHMBC.
2. Insert the adapter connector (2) into the external power connector (3) and tighten the adapter screw (4).
3. Insert the AC power adapter plug (5) into an outlet.
4. The power indicator (6) will flash, indicating the main internal battery is charging. The battery is fully charged when the power indicator (6) remains lit.



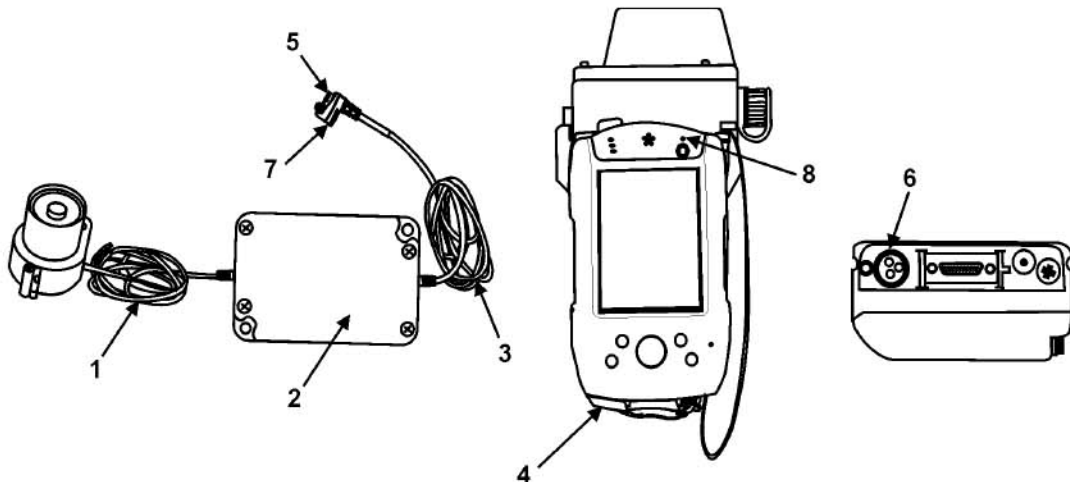
5. To remove the AC power adapter, remove the adapter plug (5) from the outlet and unscrew the adapter screw (4) from the LHMBC.
6. Replace the external power connector cover (1).



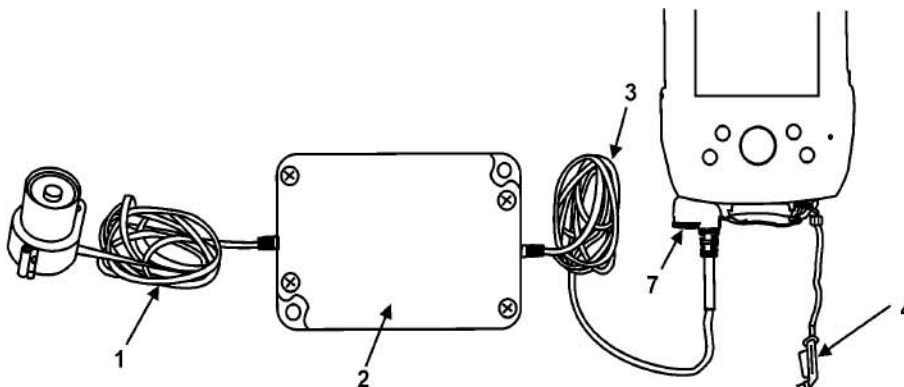
**RECHARGING LHMBC INTERNAL BATTERIES - Continued****Using DC Power Cables (NATO Cable Kit, Vehicle Battery Cable, Radio Rack Cable)****NOTE**

A vehicle battery cable or a radio rack cable can be used to charge the LHMBC main internal battery using DC power cables. They are not part of the M32 LHMBC. They are listed on the AAL (see WP 0053 00).

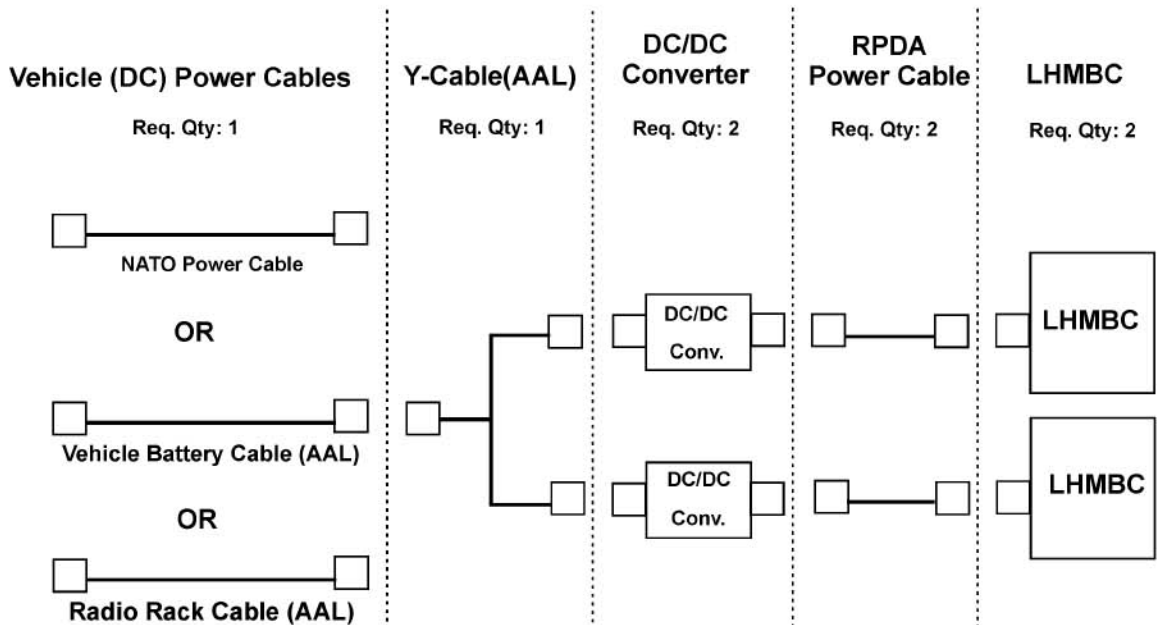
1. Connect one of DC power supply cables (1) to the DC/DC converter box (2).
2. Connect the converter kit cable (3) to the DC/DC converter box (2).
3. Remove the external power connector cover (4) from the LHMBC.
4. Insert the adapter connector (5) into the external power connector (6) and tighten the adapter screw (7).
5. Connect the DC power cable (1) to the DC power source (NATO, vehicle battery, or radio rack).
6. The power indicator (8) will flash, indicating the main internal battery is charging. The battery is fully charged when the power indicator (8) remains lit.



7. To remove the DC power supply, remove the DC power cable (1) from the DC power source. Unscrew the adapter screw (7) from the LHMBC. Unscrew the DC power cable connector (1) and the converter kit cable (3) from the converter box (2).
8. Replace the external power connector cover (4).



## DC Power To Two LHMBCs Using One DC source



### Using Battery Adapter

#### **WARNING**

The Lithium-sulfur dioxide (Li-SO<sub>2</sub>) battery pack BA5800 and the rechargeable BB2800 CANNOT be used to charge the LHMBC because the battery adapter may rupture causing injury to personnel due to battery out gassing.

Lithium batteries are potentially hazardous if misused or tampered with. To prevent injury to personnel or equipment damage, the batteries should not be heated, crushed, punctured, mutilated, opened, disassembled, short circuited, recharged, or used under conditions exceeding the operational condition. If heated or disposed in a fire, lithium batteries can explode.

Do not incinerate or heat batteries. Batteries could rupture.

Do not mix and use different types of batteries and/or new and used batteries. Batteries could rupture or leak.

Use ONLY the 1.5/1.8 volt AA batteries specified herein.

NEVER attempt to charge non-rechargeable batteries, such as the L91 Lithium batteries. Batteries could rupture or leak.

Use caution when changing the AA batteries if the battery adapter has been used. The AA batteries can get very HOT.

The white ring inside the battery adapter housing ensures the battery pack BA5800 and the rechargeable BB2800 do not fit inside the battery adapter. It also ensures that if the battery holder is inserted improperly into the battery adapter, the battery holder will not damage the connector in the bottom of the battery adapter.

#### **CAUTION**

Do not use the stylus to remove the batteries from the battery holder. The stylus may break.

Do not carry loose batteries in a pocket with metal objects. The batteries may short circuit generating high heat.

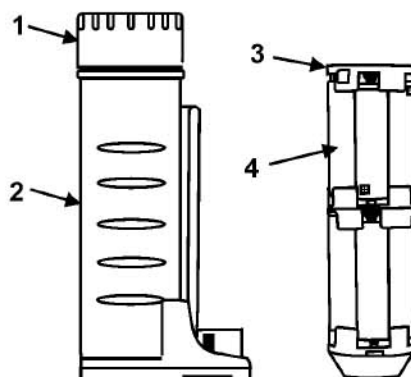
#### **NOTE**

Rechargeable batteries are authorized for use with the LHMBC. A battery charger is not provided.

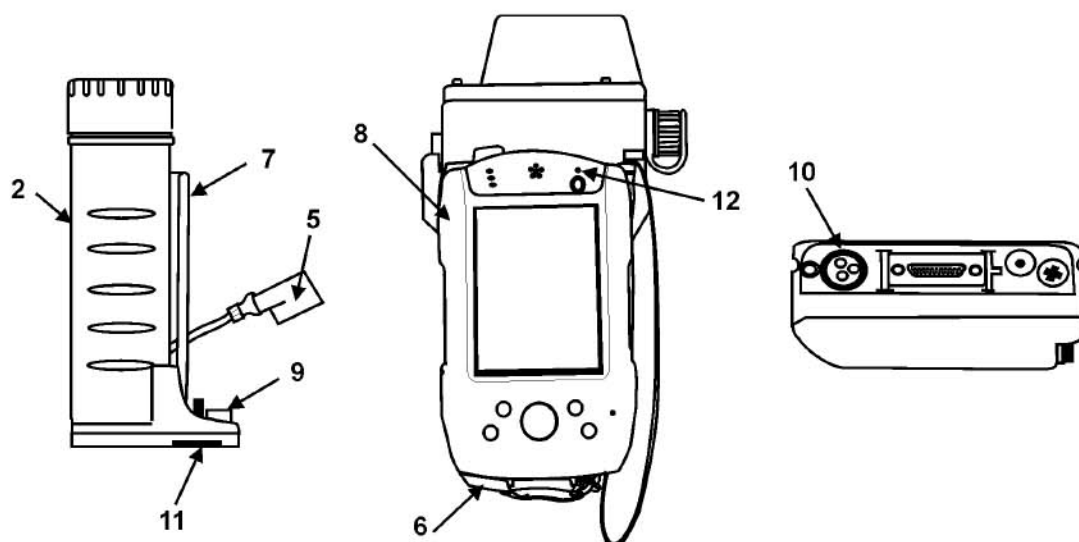
The ten AA battery holder is shown in the following procedures. An eight AA battery holder can be used.

**RECHARGING LHMBC INTERNAL BATTERIES - Continued****Using Battery Adapter - Continued**

1. Unscrew the battery adapter cap (1) from the battery adapter (2) and remove the battery holder (3).
2. Insert AA batteries (4) in the battery holder (3), ensuring correct polarity as marked on the battery holder (3).
3. Place the battery holder (3), tapered end first, inside the battery adapter (2).
4. Screw the battery adapter cap (1) onto the battery adapter (2) hand tight only.

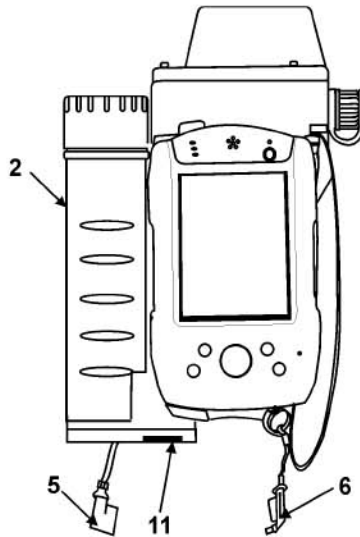


5. Remove the adapter connector cover (5) on the battery adapter (2).
6. Remove the external power connector cover (6) on the LHMBC.
7. Slide the battery adapter bracket (7) up the side rail (8) of the LHMBC until the adapter connector (9) seats against the external power connector (10).
8. Secure the battery adapter (2) to the LHMBC by tightening the adapter screw (11).
9. The power indicator (12) will flash, indicating the main internal battery is charging. The battery is fully charged when the power indicator remains lit.





10. To remove the battery adapter (2), unscrew the adapter screw (11) from the LHMBC and slide the battery adapter (2) off the LHMBC.
11. Replace the external power connector cover (6) and the adapter connector cover (5).



## RESETTING LHMBC

### Soft Reset

#### **CAUTION**

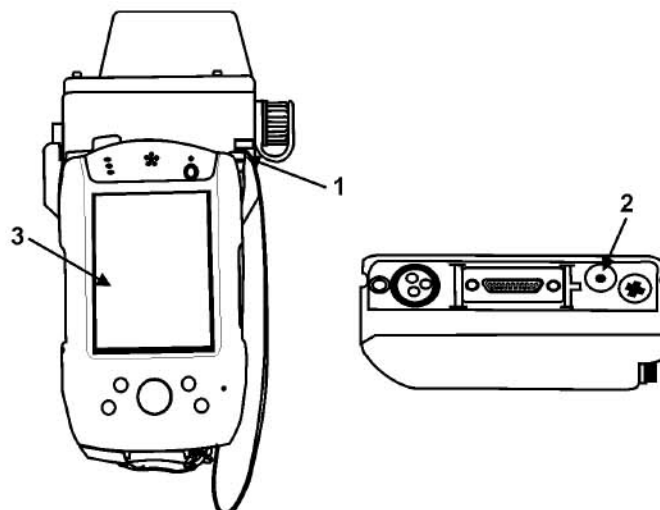
Do not insert the stylus into the Soft Reset button with excessive force. The stylus or Soft Reset button may break.

#### **NOTE**

A soft reset does not delete saved data.

Several attempts may be required to initiate a soft reset.

1. Insert the stylus (1) into the Soft Reset button (2) on the bottom of the LHMBC. If the LHMBC is turned on, the display screen (3) goes blank and begins to reboot.



2. When the Start screen is displayed, the soft reset is complete. If an expansion pack is attached to the LHMBC, a "New Modem Detected" information message may be displayed. Click **Dismiss**.

## RESETTING LHMBC - Continued

### Hard Reset

#### Method 1: Hard Reset Application

#### **NOTE**

External power can remain attached to the LHMBC when running the hard reset application using the pull-down list.

The hard reset application deletes current data and the LHMBC application.

1. Click **Start/Programs/Hard Reset**.
2. A Hard Reset warning is displayed. Click **OK**. The screen goes blank.
3. Tap the screen when prompted.
4. The align **screen** is displayed. Follow the directions on the screen to align the display screen.
5. The stylus screen is displayed. Click **Next** in the lower right corner.
6. The pop-up menus screen is displayed. Follow the directions on the screen to cut and paste, then click **Next** in the lower right corner.
7. The location screen is displayed. Select a time zone from the list, then click **Next** in the lower right corner.
8. The complete screen is displayed. Tap the screen to exit the **complete** screen.
9. Tap the expand screen. Tap the print screen. Wait until the Start screen is displayed. If an expansion pack is attached to the LHMBC, a "New Modem Detected" information message may be displayed. Click **Dismiss**.
10. The hard reset application is complete. Re-install the LHMBC software (see procedures in this WP).

#### Method 2: Physical Hard Reset

#### **CAUTION**

Do not insert the stylus into the Soft Reset button with excessive force. The stylus or Soft Reset button may break.

#### **NOTE**

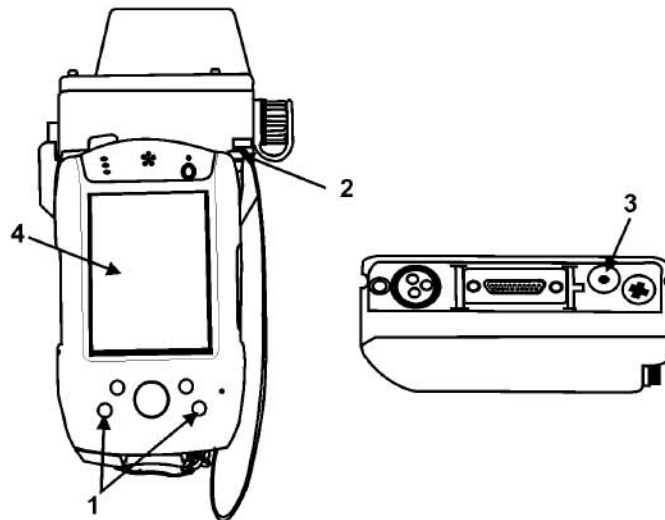
The physical hard reset is used when the password has been forgotten or is unknown and the LHMBC does not have an expansion pack attached. This method cannot be performed if any external power is attached to the LHMBC.

A physical hard reset deletes saved data and the LHMBC software needs to be re-installed.

Several attempts may be required to initiate a physical hard reset.

1. Ensure external power is removed.
2. Remove the expansion pack, if present (see procedures in this WP).

3. While holding down the two bottom buttons (1), insert the stylus (2) into the Soft Reset button (3) on the bottom of the LHMBC. If the LHMBC is turned on, the display screen (4) goes blank.
4. Press the Soft Reset button (3) to turn on the LHMBC, if necessary. If the Align screen does not appear, perform a physical hard reset again.



5. Follow the directions on the screen until the Start screen is displayed.
6. Reconnect the expansion pack, if necessary.
7. Re-install the LHMBC software (see procedures in this WP).

## RE-INSTALLING LHMBC SOFTWARE

1. Click **Start/Programs/File Explorer**. Perform a hard reset (see procedures in this WP) if File Explorer is not available.
2. The top menu should be **My Device**. If not, click the down arrow (▼) and then click **My Device**.
3. Click **iPaq File Store/Install**.
4. Follow the on-screen instructions.

## SETTING UP LHMBC OPERATING SYSTEM

### NOTE

Clicking the **X** or **ok** at the top right of a screen closes that screen.

The following lists the requirements and options for the LHMBC operating system.

<b>Start</b>	
<b>Today</b>	Main screen that displays owner information, etc.
<b>Calculator</b>	Used for basic calculations.
<b>Hard Reset</b>	Performs complete reset on LHMBC where settings and files are erased.
<b>LHMBC</b>	Starts LHMBC software.
<b>Maintenance</b>	Starts LHMBC maintenance application.
<b>Find</b>	Not available.
<b>Help</b>	Guide to help with operating PDA.
<b>Start/Programs</b>	
<b>Games icon</b>	Not available.
<b>IPaq Backup icon</b>	Backup utility used to backup/restore to main memory.
<b>Itask icon</b>	Allows quick access to most frequently used features on PDA.
<b>PC-cillin icon</b>	PDA virus protection.
<b>Pointsec icon</b>	PDA security.
<b>Zeroize icon</b>	Totally disables PDA (PDA is unusable).
<b>Start/Settings</b>	
<b>Personal tab</b>	
<b>Input icon</b>	Changes options associated with input method, word completion, writing and recording.
<b>Owner Information icon</b>	Used to input personal information to personalize PDA.
<b>System tab</b>	
<b>About icon</b>	Displays information about PDA, such as device name, copyrights and operating system version.
<b>Asset Viewer icon</b>	Displays PDA version information for all hardware and software.
<b>Backlight icon</b>	Customizes backlight.
<b>HP Enroll icon</b>	Not used.
<b>ClearType Tuner icon</b>	Improves readability of screen fonts.
<b>Clock icon</b>	Changes time settings.
<b>Expansion Pack icon</b>	Displays information about expansion pack.
<b>iPAC Audio icon</b>	Customizes audio settings for PDA.
<b>iTask Settings icon</b>	Customizes iTask feature.
<b>Memory icon</b>	Displays amount of memory system has allocated and amount of memory used and available.
<b>Power icon</b>	Shows strength of battery and options available to conserve battery power.
<b>Regional Settings icon</b>	Customizes region, time, etc.
<b>Remove Program icon</b>	Removes programs installed in storage memory.
<b>Screen icon</b>	Adjust PDA screen.
<b>Self Test icon</b>	Performs tests on PDA.
<b>Connections tab</b>	Empty.
<b>Volume icon</b>	Sets PDA volume.

## PERFORMING SELF TEST

The LHMBC operating system has a built in Self Test that can be used to troubleshoot the following functions:

- Sound
- Screen Calibration
- Screen Patterns
- Read / Write Files
- IR Transfer (disabled in LHMBC)
- LED Notification
- Key Test

To launch the Self Test application, click **Start/Settings/System/Self Test**.

## PERFORMING VIRUS SCAN

### NOTE

Although the chance of the LHMBC getting a virus is unlikely, a virus program is included.

1. Click **Start/Programs/PC-cillin**.
2. Select **SCAN** and wait until the scan is complete.
3. If a virus is found, follow the directions on the computer to delete the virus.

## CHANGING PASSWORD

1. From the operating system, either click the **Pointsec** icon in the lower right corner of the screen and select **Properties** or click **Start/Programs/Pointsec**.
2. From the Pointsec screen, click **Set Device PPIN**.
3. Type in the current password and click on the blue **OK** box.

### NOTE

A password must be at least 6 numeric characters and 3 successive characters cannot be the same.

4. When prompted for a PIN, type in a PIN in the **PIN** box and click on the blue **OK** box.
5. Confirm the correct PIN by typing the same PIN in the **Confirm** box and clicking on the blue **OK** box.
6. Click **OK** in the top right screen to close the Pointsec screen and then the **X** in the top right screen to close the Programs screen.

## RESETTING FORGOTTEN PASSWORD

### NOTE

If a password is forgotten, a physical hard reset needs to be performed and the LHMBC software re-installed from the file store. The procedures for resetting a forgotten password depend on the hardware configuration. The expansion pack needs to be removed on the M32 LHMBC.

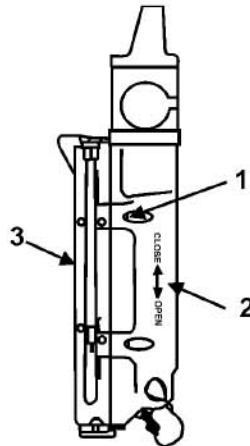
1. If applicable, remove the expansion pack from the LHMBC (see procedures in this WP).
2. Perform a physical hard reset (see procedures in this WP).
3. If applicable, install the expansion pack onto the LHMBC (see procedures in this WP).
4. Re-install the LHMBC software (see procedures in this WP). During re-install, a new password can be chosen.

**REMOVING/REPLACING EXPANSION PACK****CAUTION**

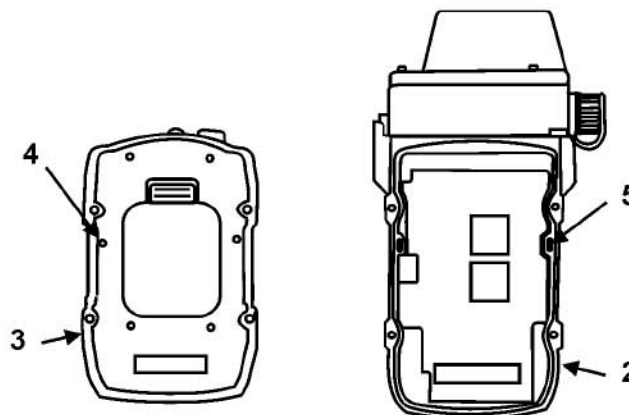
Use caution when removing the expansion pack so the circuitry and/or fragile components are not damaged. Perform this procedure under the best conditions possible.

Whenever the expansion pack is removed from the LHMBC, a cover plate should be installed on the expansion pack and the LHMBC to protect the circuitry and fragile components.

1. Loosen the four screws (1) and carefully slide the expansion pack (2) down ("OPEN") to remove from the LHMBC (3).



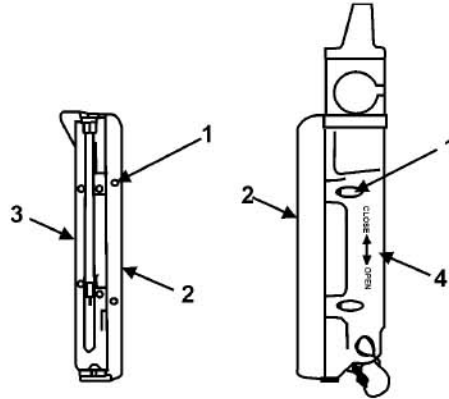
2. Replace the expansion pack (2) by lining the two LHMBC pins (4) with the two expansion pack slots (5) and sliding the expansion pack (2) up ("CLOSE") onto the LHMBC (3) as far as it will go. Tighten the four screws (1).



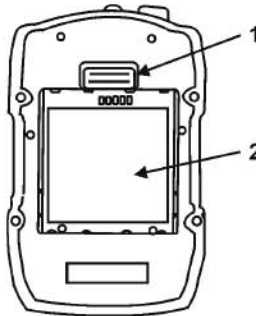
**REMOVING/REPLACING COVER PLATES ON LHMBC AND EXPANSION PACK****CAUTION**

Use caution when removing the cover plates so the circuitry and/or fragile components are not damaged. Perform this procedure under the best conditions possible.

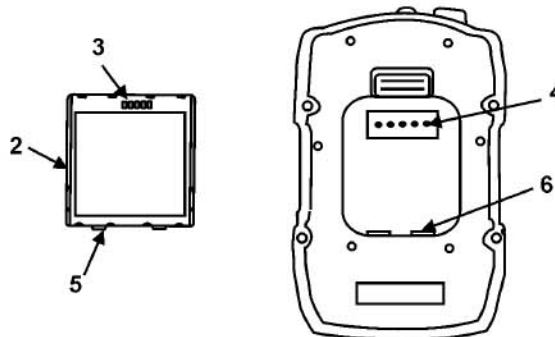
1. Loosen the four screws (1) and carefully remove the cover plate (2) from the LHMBC (3) or the expansion pack (4).
2. Replace the cover plate (2) by tightening the four screws (1).

**REPLACING/RESETTING LHMBC INTERNAL BATTERY**

1. If applicable, remove the expansion pack from the LHMBC (see procedures in this WP).
2. Slide the catch (1) up to release the main internal battery (2) and remove the battery (2).



3. Insert a new main internal battery (2) by ensuring the battery copper slots (3) face the LHMBC copper prongs (4) and sliding the battery tabs (5) into the LHMBC slots (6). Snap the battery (2) in place.



4. Ensure gasket is present and not damaged.
5. If applicable, replace the expansion pack onto the LHMBC (see procedures in this WP).

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**STORING LHMBC****NOTE**

If the LHMBC is not going to be used for an extended amount of time, the LHMBC must be put into storage configuration to conserve the main internal battery.

**M32 LHMBC (With Expansion Pack)**

1. Remove external power.
2. Remove the expansion pack (see procedures in this WP).
3. Remove and store the main internal battery (see procedures in this WP).
4. Either re-install the expansion pack onto the LHMBC or install a cover plate on the LHMBC and on the expansion pack (see procedures in this WP).
5. To return from storage, remove the expansion pack from the LHMBC or the cover plates from the LHMBC and the expansion pack. Install the main internal battery into the LHMBC. Install the expansion pack onto the LHMBC. Perform a soft reset (see procedures in this WP).

**Basic LHMBC (Without Expansion Pack)**

1. Remove external power.
2. Perform a physical hard reset (see procedures in this WP) and press reset switch for 13 seconds. The LHMBC is in storage if it does not wake up using the Sleep button.
3. To return from storage, perform a soft reset (see procedures in this WP).

**CLEANING****WARNING**

To reduce the risk of electrical shock, do not spray liquid directly on the screen or allow excess liquid to drip inside the LHMBC. Keep all ports covered, especially the SD slot.

**CAUTION**

Do not use any cleaning solvent on the LHMBC that may damage the display screen.

Clean the M32 LHMBC components using a soft, lint-free cloth dampened only with water.

**END OF WORK PACKAGE**



## **CHAPTER 6**

# **UNIT MAINTENANCE INSTRUCTIONS FOR LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

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**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****SERVICE UPON RECEIPT**

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**INITIAL SETUP:****References**

AR 735-11-2

DA PAM 738-750

SF 361

SF 364

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**SERVICE UPON RECEIPT OF MATERIEL****Unpacking**

When a new or reconditioned component of the M32 LHMBC is received, be aware of any shipping damage to packaging materiel. Report any damage on SF 364, Report of Discrepancy (ROD), as prescribed in AR 735-11-2. Retain packaging material for future use.

**Checking Unpacked Equipment**

Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 361, Transportation Discrepancy Report.

Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with applicable service instructions (e.g., for Army instructions, see DA PAM 738-750).

Check to see if the equipment has been modified.

**END OF WORK PACKAGE**

**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****UNIT PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)**

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**INITIAL SETUP:**None

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**NOTE**

No PMCS is required at the unit maintenance level.

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**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****UNIT MAINTENANCE PROCEDURES**

---

**INITIAL SETUP:****Tools and Special Tools**

Multimeter

**References**

DA Form 2409

WP 0001 00

**References - Continued**

WP 0018 00

WP 0036 00

WP 0044 00

WP 0058 00

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**GENERAL**

This work package provides procedures for performing continuity and voltage tests, re-installing the LHMBC software using the SD memory card, replacing the modem card, attaching hot battery stickers, performing functional tests, replacing M32 LHMBC components, and preparation for storage or shipping.

All of the M32 components are under warranty. While the components are under warranty, the recommended method for replacing/repairing a component is to return it to the contractor (see WP 0058 00 for warranty information). Unit maintenance has the option of replacing the expansion pack, the internal battery, and/or the modem card and sending the replaced component to the contractor or a higher level support for warranty action in accordance with SOP.

**WARNING**

Lithium batteries are potentially hazardous if misused or tampered with. To prevent injury to personnel or equipment damage, the batteries should not be heated, crushed, punctured, mutilated, opened, disassembled, short circuited, recharged, or used under conditions exceeding the operational condition. If heated or disposed in a fire, lithium batteries can explode.

Do not mix and use different types of batteries and/or new and used batteries. Batteries could rupture or leak.

The white ring inside the battery adapter housing ensures the battery pack BA5800 and the rechargeable BB2800 do not fit inside the battery adapter. It also ensures that if the battery holder is inserted improperly into the battery adapter, the battery holder will not damage the connector in the bottom of the battery adapter.

**CAUTION**

Do not use the stylus to remove the batteries from the battery holder. The stylus may break.

**NOTE**

Maintenance procedures should be performed in a clean, static-free environment.

## PERFORMING CONTINUITY TEST

### WARNING

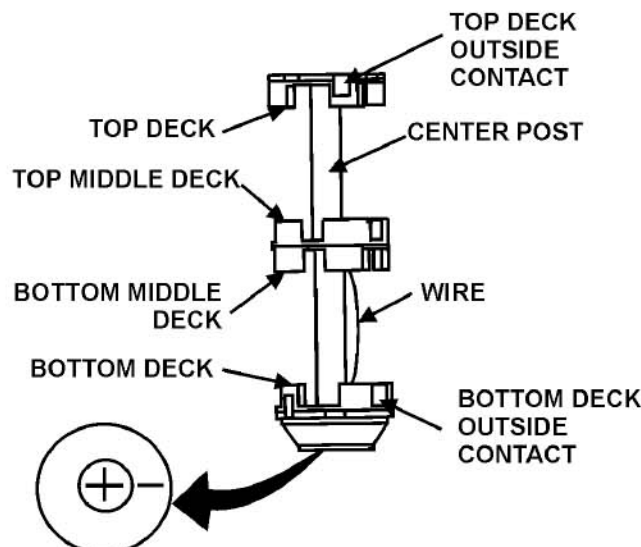
Use caution when changing the AA batteries if the battery adapter has been used. The AA batteries can get very HOT.

### CAUTION

The batteries must be removed from the battery holder before performing a continuity test.

#### Ten AA Battery Holder

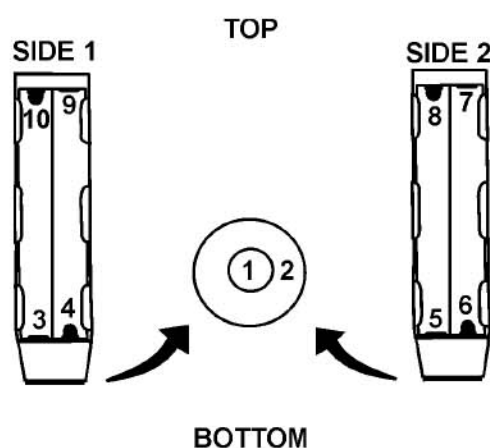
1. Ensure the batteries are removed from the battery holder.
2. Place the negative probe on the negative ring and place the positive probe on the wire running down the center post.
3. Place the positive probe on the positive ring and place the negative probe on the inside bottom deck terminal to the right of the bottom deck outside contact.
4. Place the negative probe on the positive ring and place the positive probe on the inside bottom deck terminal to the right of the bottom deck outside contact.
5. Place either probe on the inside bottom deck spring terminal two positions to the right of the bottom deck outside contact and the other probe to the next right contact.
6. Place either probe on the inside bottom deck spring terminal to the left of the bottom deck outside contact and the other probe to the next left contact.
7. Place either probe on the negative ring and the other probe to the bottom middle deck spring terminal to the left of the wire running down the inside center post.
8. Place either probe on the bottom middle deck spring terminal to the left of the wire running down the center post and the other probe to the spring terminal below it.
9. Place either probe on the bottom middle deck spring terminal two positions to the left of the wire running down the center post and the other probe to the positive rivet terminal below it.



10. Place either probe on the bottom middle deck positive rivet terminal three positions to the left of the wire running down the center post and the other probe to the spring terminal below it.
11. Place either probe on the bottom middle deck spring terminal four positions to the left of the wire running down the center post and the other probe to positive rivet terminal below it.
12. Place either probe on the bottom middle deck positive rivet terminal five positions to the left of the wire running down the center post and the other probe to the spring terminal below it.
13. Place the positive probe on the positive ring and place the negative probe on the top deck positive rivet terminal to the left of the outside terminal.
14. Place either probe on the top deck spring terminal two positions to the left of the top deck outside contact and the other probe to the positive rivet terminal to the left.
15. Place either probe on the top deck spring terminal to the right of the top deck outside contact and the other probe to the positive rivet terminal to the right.
16. Place the positive probe to the positive ring and the negative probe to the bottom deck outside contact.
17. Place the positive probe to the positive ring and the negative probe to the top deck outside contact.

### Eight AA Battery Holder

1. Ensure the batteries are removed from the battery holder.
2. Check the positive (+) contact (center circle) located on the bottom of the battery holder with two positive (+) contacts on the inside bottom end of the battery holder.
3. Check the negative (-) contact (outer circle) located on the bottom of the battery holder with the two negative (-) contacts on the inside bottom end of the battery holder.
4. Check the two positive (+) contacts at the inside top end of the battery holder with the corresponding negative (-) contacts on the inside top end of the battery holder.

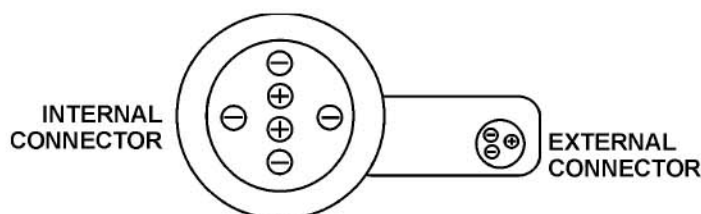


Black Meter Lead	Connection Red Meter Lead	Approximate Resistance
1(+)	3(+), 5(+)	4.2 k ohm
2(-)	4(-), 6(-)	<1 ohm
7(+)	10(-)	<1 ohm
9(+)	8(-)	<1 ohm

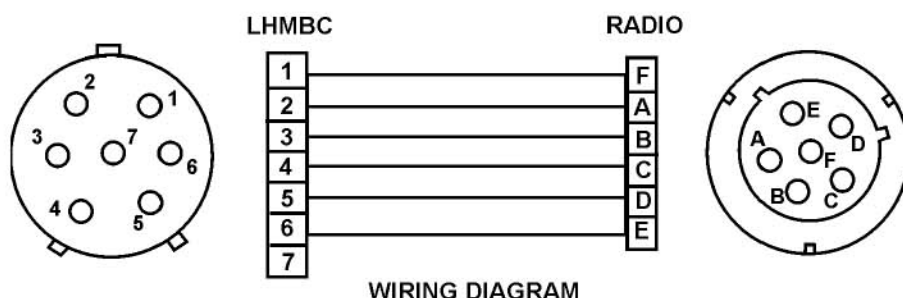
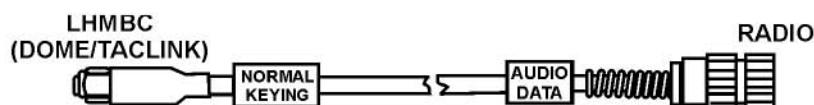
# PERFORMING CONTINUITY TEST - Continued

## Battery Adapter

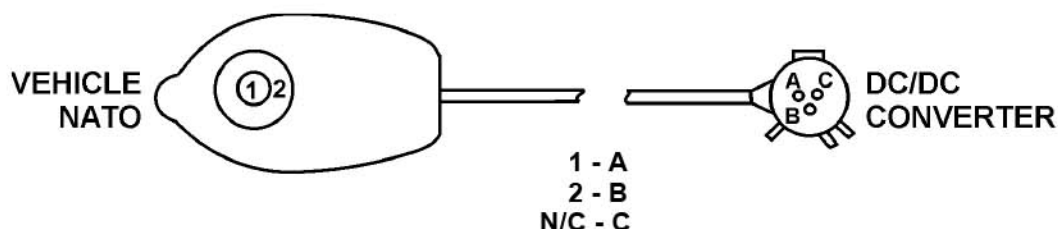
1. Ensure the battery holder is removed from the battery adapter.
2. Check the two positive (+) contacts (inside pins) on the internal connector (1) of the battery adapter with the + contact on the external connector (2) of the battery adapter.
3. Check the four negative (-) contacts (outside pins) on the internal connector (1) of the battery adapter with each - contact on the external connector (2) of the battery adapter.



## Radio Cable

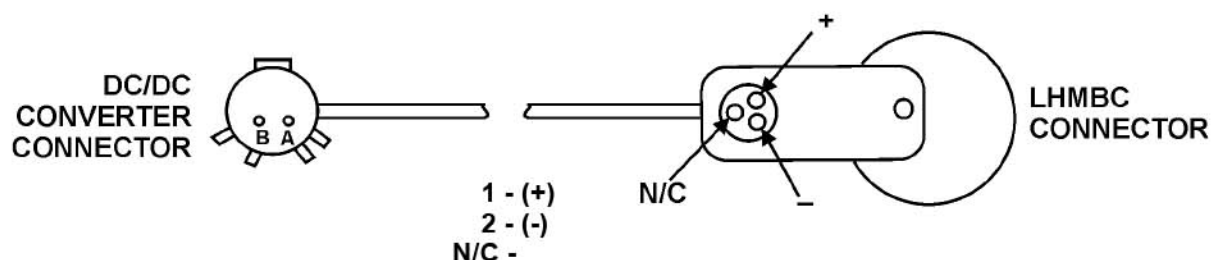


## NATO Cable

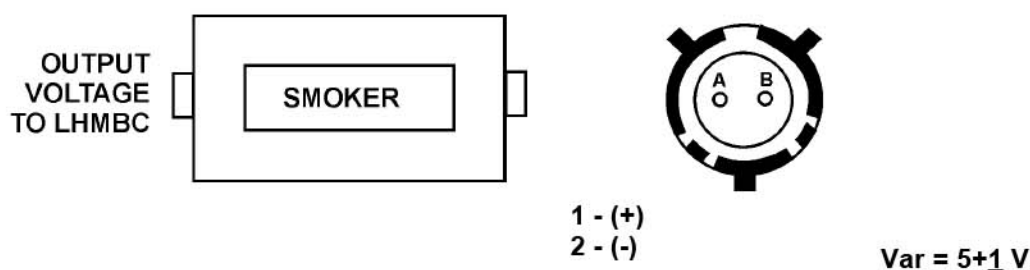


Note: Numbers are not displayed on Vehicle NATO (they are for reference only)  
N/C = no connect

## RPDA Power Cable



## DC/DC Converter Output Voltage



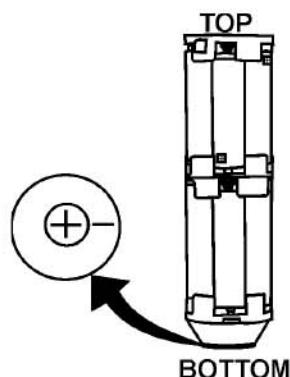
## PERFORM VOLTAGE TEST

## Eight or Ten AA Battery Holder

## NOTE

The voltage test is the same for the eight and ten AA battery holders. The ten AA battery holder is shown in the illustration.

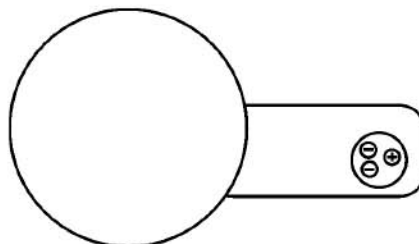
1. Ensure the appropriate amount of batteries are properly inserted into the battery holder.
2. Place the red multimeter probe on the positive (+) contact (center circle) located on the bottom of the battery holder and place the black multimeter probe on the negative (-) contact (outer circle) located on the bottom of the battery holder. The voltage reading should be  $6 \pm 2$  DC volts.



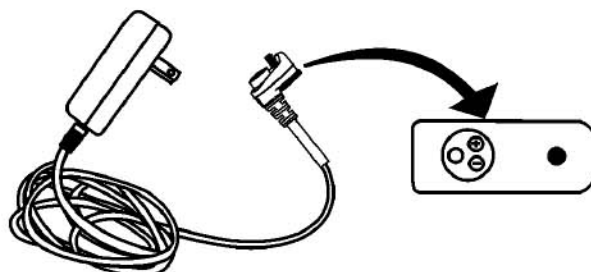


**PERFORM VOLTAGE TEST - Continued****Battery Adapter**

1. Insert the battery holder, with batteries, into the battery adapter.
2. Place the red multimeter probe on the positive (+) contact on the external connector of the battery adapter and place the black multimeter probe on each negative (-) contact on the external connector of the battery adapter. The voltage readings should be  $5 \pm 1$  DC volts.
3. If one or more of the voltage readings is not  $5 \pm 1$  DC volts, check each battery to ensure each battery is charged.

**AC Power Adapter**

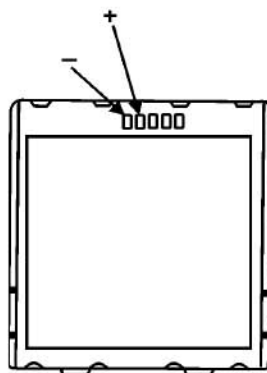
1. Plug the AC power adapter into an outlet.
2. Place the red multimeter probe on the positive (+) contact on the adapter connector of the AC power adapter and place the black multimeter probe on each negative (-) contact on the adapter connector of the AC power adapter. The voltage readings should be  $5 \pm 1$  DC volts.

**Main Internal Battery****NOTE**

If the LHMBC can be turned on with external power or by internal batteries alone, there is no need to perform a voltage test on the main internal battery.

1. Remove the expansion pack or the cover plate from the LHMBC (see WP 0040 00).
2. Remove the main internal battery from the LHMBC.

3. Place the red multimeter probe on the positive (+) contact of the main internal battery and place the black multimeter probe on the negative (-) contact on the main internal battery.



4. The voltage reading should be greater than 3.2 volts.
  - a. If the voltage is above 3.2 volts but the battery will not power the LHMBC, the main internal battery should be operational after a few hours of charging. Charge the main internal battery for 2 hours and attempt to turn on the LHMBC by performing a soft reset (see WP 0040 00).
  - b. If the voltage is below 3.2 volts, the main internal battery may be dormant. Attempt to revive the main internal battery by recharging it for up to 6 days. If the main internal battery is not functional after 6 days of charging, discard the main internal battery in accordance with SOP.

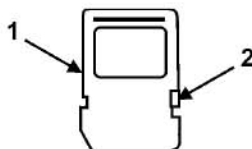
## RE-INSTALLING LHMBC SOFTWARE

### **CAUTION**

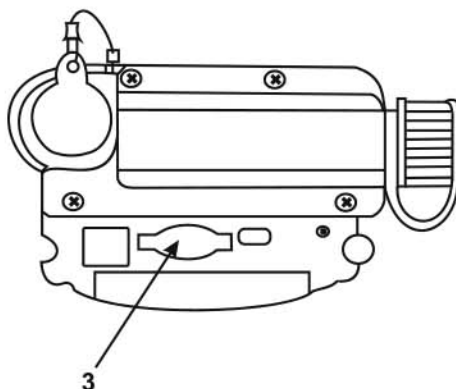
Third party software may cause a virus in the LHMBC system. Only the assigned SD memory card is allowed for the LHMBC system. Do not load any third party software via the SD slot, Bluetooth, or WLAN.

The SD memory card must be locked to avoid encryption during the following procedures.

1. Ensure LHMBC is on and running.
2. Ensure the SD memory card (1) is in locked position (2).

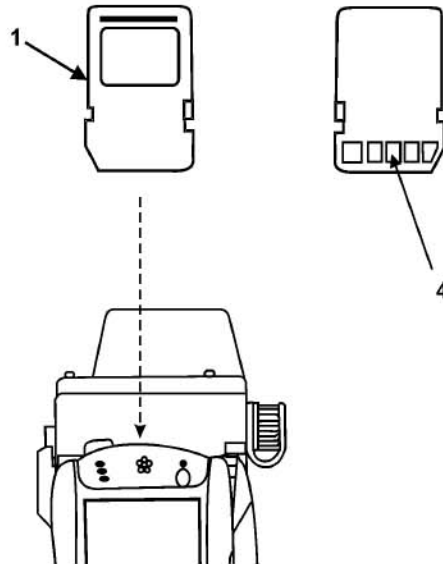


3. Remove the SD cover sticker and the SD cover (3) from the SD slot on top of the LHMBC.



**RE-INSTALLING LHMBC SOFTWARE - Continued**

4. Insert the SD memory card (1) into the slot, ensuring the contacts (4) on the back are facing down and toward the expansion pack.



5. Using the stylus, gently push down on the SD memory card (1) until it clicks down into the SD slot.
6. Replace the SD cover sticker, temporarily.
7. Click **Start/Programs/File Explorer**. If File Explorer is not available, run the hard reset application (see WP 0040 00).
8. The top menu should be **My Device**. If not, click the down arrow (▼) and then click **My Device**.
9. Click **Storage Card**. If **Storage Card** is not on the list:
  - a. Ensure SD memory card is correctly oriented and seated.
  - b. If possible, try the SD memory card in another LHMBC. Verify the SD memory card is recognized and that the install program is present.
  - c. Perform a soft reset (see WP 0040 00).
  - d. If problem persists, replace either the SD memory card or the Basic LHMBC, as applicable.
10. Click **Install**. A DOD Warning screen is displayed. If the message “IMMEDIATELY after reset, run this installation” is displayed rather than the DOD Warning, click **OK**. The LHMBC will automatically perform a hard reset again. Follow the directions on the screen and then return to step 6 of these procedures.

**NOTE**

The following step will take several minutes. DO NOT TAP the display screen.

11. Wait while files are copied to the LHMBC. Do not tap the display screen. Files are installed when the request to “Draw a line” screen is displayed.
12. When prompted with “Draw a line to use for key generation”, use the stylus to draw a line across the display screen.

**CAUTION**

It is IMPORTANT to remove the SD memory card before continuing with the installation procedures to avoid possible encryption of the card.

13. Remove the SD memory card and replace the SD cover and the SD cover sticker.
14. When prompted for a PIN, type in a PIN in the **PIN** box. (The default PIN is **112233**.)
15. Click the blue **OK** box.
16. Confirm the correct PIN by typing the same PIN in the **Confirm** box and clicking the blue **OK** box.
17. The LHMBC reboots automatically. Do not tap the display screen.
18. When the password prompt is displayed, type in the PIN and click the blue **OK** box.

**NOTE**

If the SD memory card was not removed, an unencrypted warning is displayed. **No** must be clicked. A security policy warning is then displayed. Clicking **OK** will display the Start screen.

19. Reset the date and time by clicking the date under **Start**.
20. To start the LHMBC software, click **Start/LHMBC**.

**NOTE**

The software version can be confirmed on the Status screen or the LHMBC Maintenance screen.

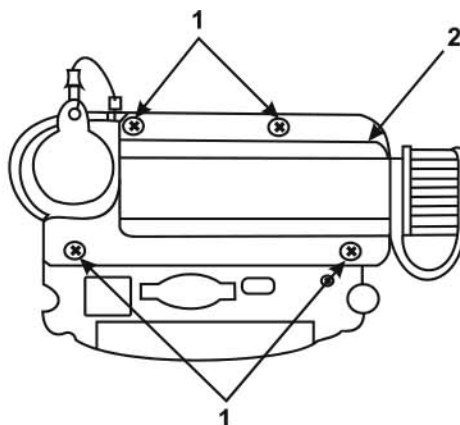
**REPLACING MODEM CARD****CAUTION**

Use caution when removing the dome assembly so the GPS antenna is not damaged.

**NOTE**

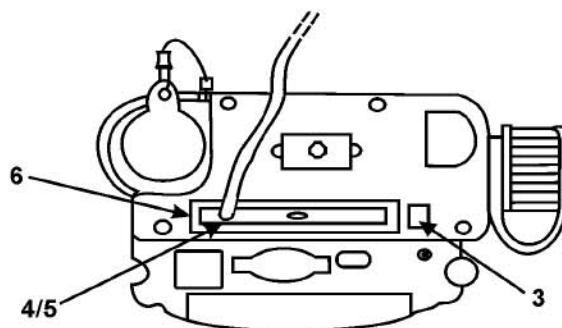
Observe the hardware configuration to aid in re-assembly.

1. Loosen the four screws (1) and remove the dome assembly (2).

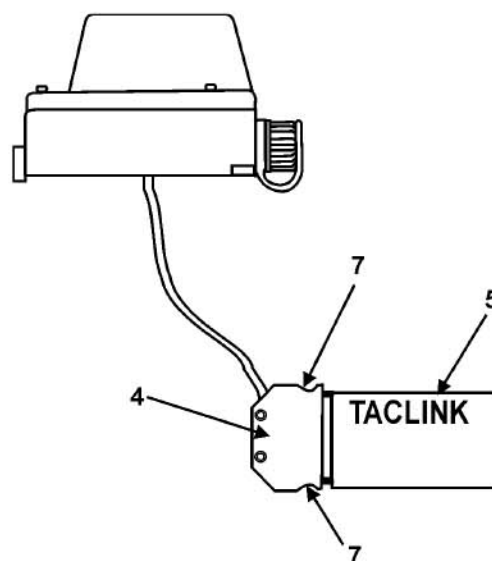


**REPLACING MODEM CARD - Continued**

2. Using the stylus, press the eject button (3) to release the button. Press it again to release the attached dongle connector (4) and the modem card (5).



3. Carefully remove the dongle connector (4) and the modem card (5) and from the expansion pack slot (6).
4. Detach the modem card (5) from the dongle connector (4) by pressing in the connector buttons (7).



5. Inspect the components (dome, dongle, gasket, cables, pins, modem card, and expansion pack slot) for serviceability. Replace as needed.
6. Attach the new modem card (5) by snapping it into the dongle connector. (4).
7. Slide the modem card (5) into the expansion pack slot (6) until it clicks into place. The modem card label needs to face the same direction as the display screen.
8. Carefully replace the dome assembly (2) on the LHMBC and tighten the four screws (1).

**NOTE**

A partial Commo functional test needs to be performed after the modem card is replaced/reseated.

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## ATTACHING HOT BATTERY STICKERS

### Battery Holder

1. Place the following sticker on top of the battery holder (10 or 8 AA holder).



2. Place the following sticker around the bottom or down the side of the 8 AA battery holder.



3. Place the following sticker around the bottom of the 10 AA battery holder.



### Battery Adapter

Place the following sticker around the outside of the battery adapter.



## PERFORMING FUNCTIONAL TESTS

### Commo Functional Test

#### NOTE

For a complete functional test, the LHMBC must be connected, either digitally or by wire, to another communication device. The LHMBC needs to either be connected to external power or the internal batteries fully charged.

If the LHMBC already contains correct Commo setup data, steps 1-5 can be skipped.

1. From the operating system, select **Start/LHMBC**.
2. From the DOD Security Message screen, click **Use All**.
3. From the System Startup Settings screen, select **Commo On** and click **Use All**.
4. Click **Menu/Commo/Channel Params** and select **Wire** defaults. Click **Use All**.
5. Click **Menu/Commo/Channel Addrs**. At least 1 unit needs to have an IP Address and URN, and be **Enabled**. The following will work for the FDC: IP Address **130.139.112.042** and URN **613**.
6. Click **Menu/Commo/Enable Channel**. If “Channel enable successful” message displays, the partial functional test is complete.

#### NOTE

If another LHMBC, 2 two-wire adapters, and two-wire cable are available, perform the complete functional test in steps 7-14. If these items are not available, skip to step 15.

7. Click **Menu/Unit List**. Add a new unit named **FDC2**.
8. Click **Menu/Commo/Disable Channel**.
9. Click **Menu/Commo/Channel Addrs**. Enter a URN of **610** for **FDC2** and a **Modem Address** of **40** (IP Address will be **130.139.112.040**). Click the **Enable** checkbox to enable commo with FDC2.
10. Setup the other LHMBC with the REVERSE data:  
  
FDC: URN 610 IP 130.139.112.040  
FDC2: URN 613 IP 130.139.112.042
11. Click **Menu/Commo/Enable Channel** on each LHMBC.
12. Connect a two-wire adapter to each LHMBC's commo connector
13. Connect the 2 two-wire adapters with two-wire cable.
14. Click **Menu/Commo/PTM** to send a plain text message from one LHMBC to the other for each computer.
15. Delete any data entered to perform this functional test.

## GPS Functional Test

### NOTE

For a GPS functional test should be performed if the expansion pack was replaced/reseated. If external power is not available, ensure internal batteries are fully charged before going outdoors.

If the LHMBC already contains a correct Geo Ref, steps 1-4 can be skipped.

1. From the operating system, select **Start/LHMBC**.
2. From the DOD Security Message screen, click **Use All**.
3. From the System Startup Settings screen, select **GPS On** and click **Use All**.
4. Click **Menu/Setup/Geo Ref**. This information must be entered for GPS to function properly. Enter data for local area.
5. Click **Menu/Setup/GPS**.
6. Wait until the GPS accuracy is 25 meters or less (see WP 0018 00).
7. When accuracy is obtained, click **Menu/Unit List**. Select **FDC** and click **Edit Unit**.
8. Click **GPS** for the position. The GPS position should appear. Click **Cancel** and confirm, if necessary.
9. Click **Menu/Setup/Data**. Click **GPS Time**. The GPS time should be displayed.
10. Delete any data entered to perform this functional test.

## M32 LHMBC REPLACEMENTS

Submit a DA Form 2409, Equipment Maintenance Log, for M32 LHMBC replacements.

The Unit must call for a Return Material Authorization (RMA) number before shipping the M32 LHMBC components to the contractor. The components must be shipped in accordance with Level A packing. For warranty and shipping information, see WP 0058 00.

## PREPARATION FOR STORAGE OR SHIPMENT

1. Remove any external power (e.g., battery adapter, AC power adapter, NATO cable kit).
2. Remove the batteries from the battery holder and store for reuse or dispose of in accordance with local waste regulations.
3. Put the LHMBC in Storage (see WP 0040 00).
4. Place the M32 LHMBC components in shipping hard case.

## END OF WORK PACKAGE



**CHAPTER 7**

**PARTS INFORMATION**

**FOR**

**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

## UNIT MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTICS COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

## REPAIR PARTS AND SPECIAL TOOLS LIST (RPSTL) INTRODUCTION

## SCOPE

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of unit maintenance of the LHMBC. It authorizes the requisitioning, issue, and disposition of spares, repair parts, and special tools as indicated by the source, maintenance, and recoverability (SMR) codes.

## GENERAL

In addition to the Introduction work package, this RPSTL is divided into the following work packages.

1. **Repair Parts List Work Packages.** Work packages containing lists of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. These work packages also include parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence. Sending units, brackets, filters, and bolts are listed with the component they mount on. Bulk materials are listed by item name in FIG. BULK at the end of the work packages. Repair parts kits are listed separately in their own functional group and work package. Repair parts for reparable special tools are also listed in a separate work package. Items listed are shown on the associated illustrations.
2. **Special Tools List Work Packages.** Work packages containing lists of special tools, special TMDE, and special support equipment authorized by this RPSTL (as indicated by Basis of Issue (BOI) information in the DESCRIPTION AND USABLE ON CODE (UOC) column). Tools that are components of common tool sets and/or Class VII are not listed.
3. **Cross-Reference Indexes Work Packages.** There are two cross-reference indexes work packages in this RPSTL: the National Stock Number (NSN) Index work package and the Part Number (P/N) Index work package. The National Stock Number Index work package refers you to the figure and item number. The Part Number Index work package refers you to the figure and item number.

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES

ITEM NO. (Column (1)). Indicates the number used to identify items called out in the illustration.

SMR CODE (Column (2)). The SMR code contains supply/requisitioning information, maintenance level authorization criteria, and disposition instructions, as shown in the following breakout:

<u>Source Code</u>	<u>Maintenance Code</u>	<u>Recoverability Code</u>
<u>XX</u>	<u>XX</u>	<u>X</u>
1st two positions: How to get an item.	3rd position: Who can install, replace, or use the item.	4th position: Who can do complete repair* on the item.
		5th position: Who determines disposition action on unserviceable items.

\*Complete Repair: Maintenance capacity, capability, and authority to perform all corrective maintenance tasks of the "Repair" function in a use/user environment in order to restore serviceability to a failed item.

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES - Continued

Source Code. The source code tells you how you get an item needed for maintenance, repair, or overhaul of an end item/equipment. Explanations of source codes follow:

<u>Source Code</u>	<u>Application/Explanation</u>
PA PB PC PD PE PF PG	Stock items; use the applicable NSN to requisition/request items with these source codes. They are authorized to the level indicated by the code entered in the 3rd position of the SMR code.
<b>NOTE</b>	
Items coded PC are subject to deterioration.	
KD KF KB	Items with these codes are not to be requested/requisitioned individually. They are part of a kit which is authorized to the maintenance level indicated in the 3rd position of the SMR code. The complete kit must be requisitioned and applied.
MO-Made at unit/ AVUM level MF-Made at DS/ AVIM level MH-Made at GS level ML-Made at SRA MD-Made at depot	Items with these codes are not to be requisitioned/requested individually. They must be made from bulk material which is identified by the P/N in the DESCRIPTION AND USABLE ON CODE (UOC) column and listed in the bulk material group work package of the RPSTL. If the item is authorized to you by the 3rd position code of the SMR code, but the source code indicates it is made at higher level, order the item from the higher level of maintenance.
AO-Assembled by unit/AVUM level AF-Assembled by DS/AVIM level AH-Assembled by GS level AL-Assembled by SRA AD-Assembled by depot	Items with these codes are not to be requested/requisitioned individually. The parts that make up the assembled item must be requisitioned or fabricated and assembled at the level of maintenance indicated by the source code. If the 3rd position of the SMR code authorizes you to replace the item, but the source code indicates the item is assembled at a higher level, order the item from the higher level of maintenance.
XA	Do not requisition an "XA" coded item. Order the next higher assembly. (Refer to NOTE below.)
XB	If an item is not available from salvage, order it using the CAGEC and P/N.
XC	Installation drawings, diagrams, instruction sheets, field service drawings; identified by manufacturer's P/N.
XD	Item is not stocked. Order an XD-coded item through normal supply channels using the CAGEC and P/N given, if no NSN is available.

### NOTE

Cannibalization or controlled exchange, when authorized, may be used as a source of supply for items with the above source codes except for those items source coded "XA" or those aircraft support items restricted by requirements of AR 750-1.

**Maintenance Code.** Maintenance codes tell you the level(s) of maintenance authorized to use and repair support items. The maintenance codes are entered in the third and fourth positions of the SMR code as follows:

**Third Position.** The maintenance code entered in the third position tells you the lowest maintenance level authorized to remove, replace, and use an item. The maintenance code entered in the third position will indicate authorization to the following levels of maintenance:

#### **Maintenance**

<b>Code</b>	<b><u>Application/Explanation</u></b>
C -	Crew or operator maintenance done within unit/AVUM maintenance.
O -	Unit level/AVUM maintenance can remove, replace, and use the item.
F -	Direct support/AVIM maintenance can remove, replace, and use the item.
H -	General support maintenance can remove, replace, and use the item.
L -	Specialized repair activity can remove, replace, and use the item.
D -	Depot can remove, replace, and use the item.

**Fourth Position.** The maintenance code entered in the fourth position tells you whether or not the item is to be repaired and identifies the lowest maintenance level with the capability to do complete repair (perform all authorized repair functions).

### **NOTE**

Some limited repair may be done on the item at a lower level of maintenance, if authorized by the Maintenance Allocation Chart (MAC) and SMR codes.

#### **Maintenance**

<b>Code</b>	<b><u>Application/Explanation</u></b>
O -	Unit/AVUM is the lowest level that can do complete repair of the item.
F -	Direct support/AVIM is the lowest level that can do complete repair of the item.
H -	General support is the lowest level that can do complete repair of the item.
L -	Specialized repair activity is the lowest level that can do complete repair of the item.
D -	Depot is the lowest level that can do complete repair of the item.
Z -	Nonreparable. No repair is authorized.
B -	No repair is authorized. No parts or special tools are authorized for maintenance of "B" coded item. However, the item may be reconditioned by adjusting, lubricating, etc., at the user level.

**Recoverability Code.** Recoverability codes are assigned to items to indicate the disposition action on unserviceable items. The recoverability code is shown in the fifth position of the SMR code as follows:

#### **Recoverability**

<b>Code</b>	<b><u>Application/Explanation</u></b>
Z -	Nonreparable item. When unserviceable, condemn and dispose of the item at the level of maintenance shown in the third position of the SMR code.
O -	Reparable item. When uneconomically repairable, condemn and dispose of the item at the unit level.
F -	Reparable item. When uneconomically repairable, condemn and dispose of the item at the direct support level.
H -	Reparable item. When uneconomically repairable, condemn and dispose of the item at the general support level.
D -	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal of item are not authorized below depot level.
L -	Reparable item. Condemnation and disposal not authorized below Specialized Repair Activity (SRA).
A -	Item requires special handling or condemnation procedures because of specific reasons (such as precious metal content, high dollar value, critical material, or hazardous material). Refer to appropriate manuals/directives for specific instructions.

## EXPLANATION OF COLUMNS IN THE REPAIR PARTS LIST AND SPECIAL TOOLS LIST WORK PACKAGES - Continued

NSN (Column (3)). The NSN for the item is listed in this column.

CAGEC (Column (4)). The Commercial and Government Entity Code (CAGEC) is a five-digit code which is used to identify the manufacturer, distributor, or Government agency/activity that supplies the item.

PART NUMBER (Column (5)). Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications, standards, and inspection requirements to identify an item or range of items.

### NOTE

When you use an NSN to requisition an item, the item you receive may have a different P/N from the number listed.

DESCRIPTION AND USABLE ON CODE (UOC) (Column (6)). This column includes the following information:

1. The federal item name, and when required a minimum description to identify the item.
2. P/Ns of bulk materials are referenced in this column in the line entry to be manufactured or fabricated.
3. Hardness Critical Item (HCI). A support item that provides the equipment with special protection from electromagnetic pulse (EMP) damage during a nuclear attack.
4. The statement END OF FIGURE appears just below the last item description in column (6) for a given figure in both the repair parts list and special tools list work packages.

QTY (Column (7)). The QTY (quantity per figure) column indicates the quantity of the item used in the breakout shown on the illustration/figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column instead of a quantity indicates that the quantity is variable and quantity may change from application to application.

## EXPLANATION OF CROSS-REFERENCE INDEXES WORK PACKAGES FORMAT AND COLUMNS

1. National Stock Number (NSN) Index Work Package.

STOCK NUMBER Column. This column lists the NSN in the National Item Identification Number (NIIN) sequence. The NIIN consists of the last nine digits of the NSN.

NSN  
 (e.g., 5385-01-574-1476)  
 NIIN

When using this column to locate an item, ignore the first four digits of the NSN. However, the complete NSN should be used when ordering items by stock number.

FIG. Column. This column lists the number of the figure where the item is identified/located. The figures are in numerical order in the repair parts list and special tools list work packages.

ITEM Column. The item number identifies the item associated with the figure listed in the adjacent FIG. column. This item is also identified by the NSN listed on the same line.

2. Part Number (P/N) Index Work Package. P/Ns in this index are listed in ascending alphanumeric sequence (vertical arrangement of letter and number combinations which places the first letter or digit of each group in order "A" through "Z," followed by the numbers "0" through "9" and each following letter or digit in like order).

PART NUMBER Column. Indicates the P/N assigned to the item.

**FIG. Column.** This column lists the number of the figure where the item is identified/located in the repair parts list and special tools list work packages.

**ITEM Column.** The item number is the number assigned to the item as it appears in the figure referenced in the adjacent figure number column.

## HOW TO LOCATE REPAIR PARTS

### 1. When NSNs or P/Ns Are Not Known.

First. Using the table of contents, determine the assembly group to which the item belongs. This is necessary since figures are prepared for assembly groups and subassembly groups, and lists are divided into the same groups.

Second. Find the figure covering the functional group or the subfunctional group to which the item belongs.

Third. Identify the item on the figure and note the number(s).

Fourth. Look in the repair parts list work packages for the figure and item numbers. The NSNs and part numbers are on the same line as the associated item numbers.

### 2. When NSN Is Known.

First. If you have the NSN, look in the STOCK NUMBER column of the NSN index work package. The NSN is arranged in NIIN sequence. Note the figure and item number next to the NSN.

Second. Turn to the figure and locate the item number. Verify that the item is the one you are looking for.

### 3. When P/N is Known.

First. If you have the P/N and not the NSN, look in the PART NUMBER column of the P/N index work package. Identify the figure and item number.

Second. Look up the item on the figure in the applicable repair parts list work package.

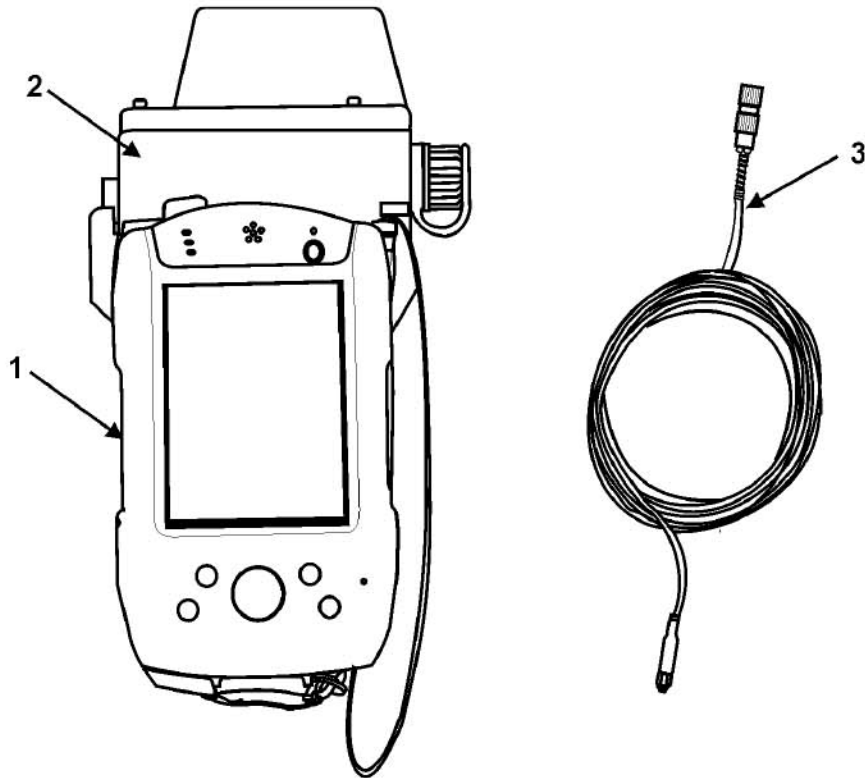
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**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTICS COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****REPAIR PARTS LIST**

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**NOTE**

Before proceeding with Repair Parts List, see Introduction to RPSTL (WP 0044 00).

**NOTE**

THE LHMBC WITH GPS (CALLOUTS 1 AND 2) CAN BE ORDERED USING PN 13007912. SEE FIG. 5.

FIGURE 1. COMPUTER, DIGITAL: PORTABLE (M32 LHMBC), PN 13007892.



(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO.	SMR CODE	NSN	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 00	
					FIGURE 1. COMPUTER, DIGITAL: PORTABLE (M32 LHMBC), PN 13007892	
1	PAOOO	7021-01-521-6088	19200	13007894	COMPUTER, DIGITAL: BASIC LHMBC (REFER TO FIG. 3 FOR COMPONENT BREAKDOWN) UOC: BN8.....	1
2	PAOOO	5895-01-521-6922	19200	13007900	INTERFACE UNIT, DATA STORAGE SYSTEM: EXPANSION PACK, SAASM GPS MODULE, AND MODEM CARD (REFER TO FIG. 4 FOR COMPONENT BREAKDOWN) UOC: BN8.....	1
3	PAOZZ	6145-01-521-4562	19200	13007910	CABLE, RADIO FREQUENCY: UOC: BN8.....	1
END OF FIGURE						

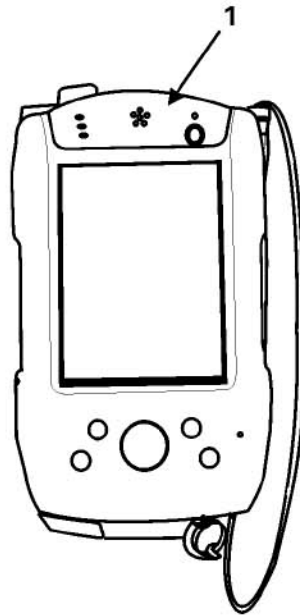


FIGURE 2. COMPUTER, DIGITAL: LHMBC, BASIC, PN 13007894.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO.	SMR CODE	NSN	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
1	PAOOO	7021-01-521-6092	19200	13007895	<p>GROUP 01*</p> <p>FIGURE 2. COMPUTER, DIGITAL: LHMBC, BASIC, PN 13007894</p> <p>COMPUTER, DIGITAL: PORTABLE RPDA 5500 (REFER TO FIG. 3 FOR COMPONENT BREAKDOWN)</p> <p>UOC: BN8 ..... 1</p> <p><b>END OF FIGURE</b></p>	

\* Group 01 also includes Basic Issue Items (BII) List (see WP 0052 00).

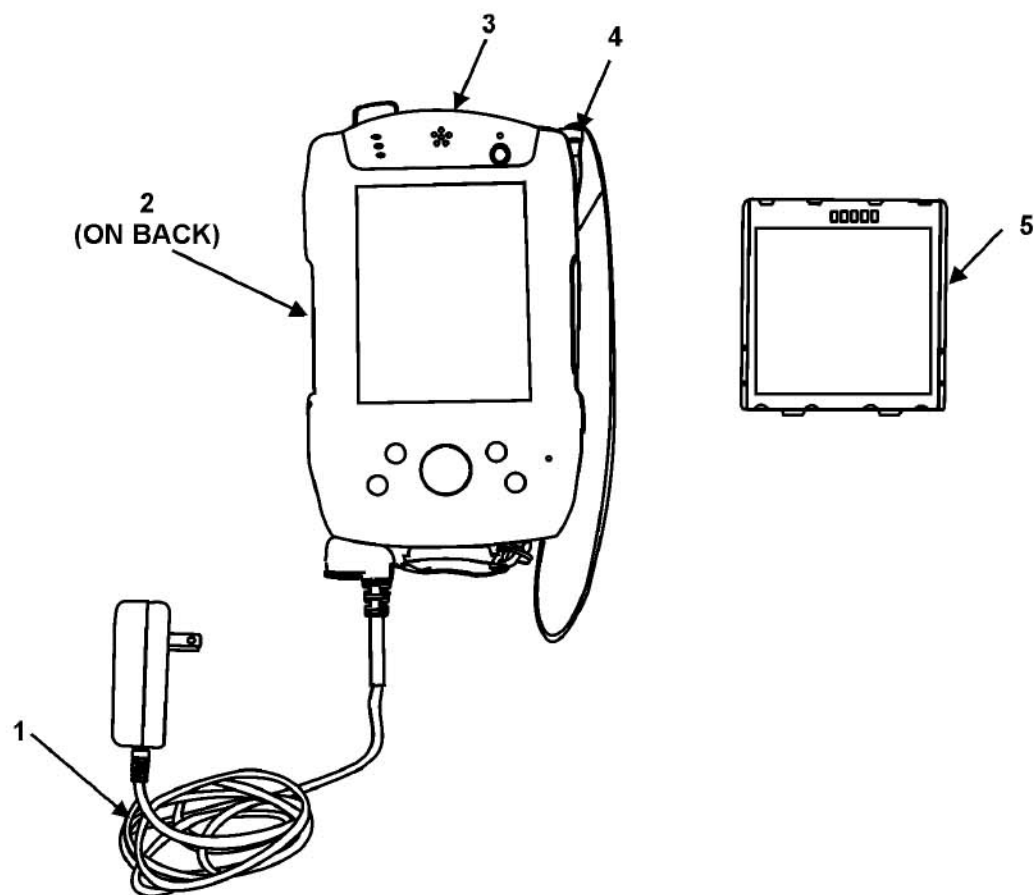


FIGURE 3. COMPUTER, DIGITAL: PORTABLE RPDA 5500, PN 13007895.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO.	SMR CODE	NSN	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 0101	
					FIGURE 3. COMPUTER, DIGITAL: PORTABLE RPDA 5500, PN 13007895	
1	PAOZZ	6130-01-521-6090	19200	13007903	ADAPTER, POWER SUPPLIER: (ALSO CALLED AC POWER ADAPTER) UOC: BN8.....	1
2	PAOZZ	TBD	TBD	TBD	BASIC LHMBC COVER PLATE UOC: BN8.....	1
3	PAOZZ	TBD	TBD	TBD	SD COVER UOC: BN8.....	1
4	PAOZZ	7520-01-521-6095	19200	13007899	STYLUS, DUPLICATING STENCIL: CONNECTOR COVERS PROVIDED UOC: BN8.....	1
5	PAOZZ	6130-01-521-6924	19200	13007898	BATTERY POWER SUPPLY: RPDA INTERNAL BATTERY UOC: BN8.....	2
END OF FIGURE						

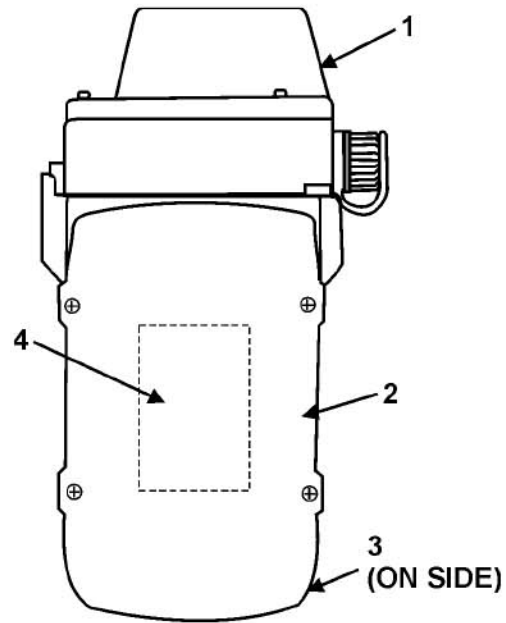


FIGURE 4. INTERFACE UNIT, DATA STORAGE SYSTEM: EXPANSION PACK,  
SAASM GPS MODULE, PN 13007900.

(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO.	SMR CODE	NSN	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 02	
					FIGURE 4. INTERFACE UNIT, DATA STORAGE SYSTEM: EXPANSION PACK, SAASM GPS MODULE, PN 13007900	
1	PAOZZ	5895-01-521-7892	19200	13007901	HOUSING, MODEM COMMUNICATIONS: GPS TACLINK DOME ASSEMBLY UOC: BN8 .....	1
2	PAOZZ	TBD	TBD	TBD	EXPANSION PACK COVER PLATE UOC: BN8 .....	1
3	PAOZZ	TBD	TBD	TBD	GPS ANTENNA CONNECTOR COVER UOC: BN8 .....	1
4	PAOZZ	5895-01-518-9747	19200	12992769	MODEM, COMMUNICATIONS: TACLINK 3000 UOC: BN8 .....	1
END OF FIGURE						

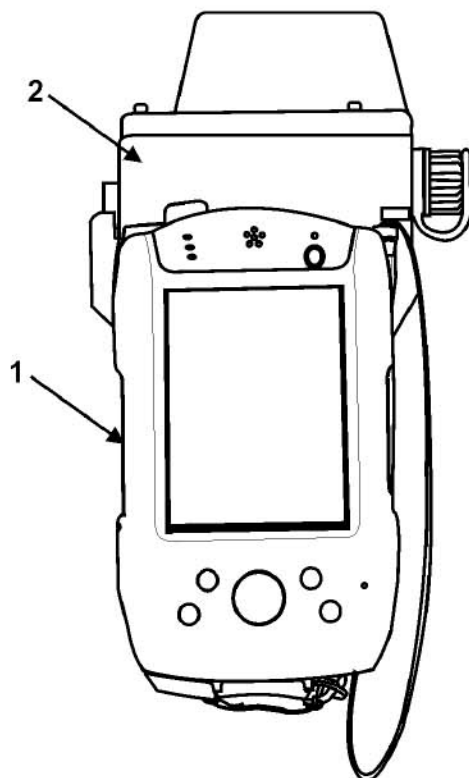


FIGURE 5. COMPUTER, DIGITAL: PORTABLE, PN 13007912.



(1)	(2)	(3)	(4)	(5)	(6)	(7)
ITEM NO.	SMR CODE	NSN	CAGEC	PART NUMBER	DESCRIPTION AND USABLE ON CODE (UOC)	QTY
					GROUP 03	
					FIGURE 5. COMPUTER, DIGITAL: PORTABLE, PN 13007912	
1	PAOOO	7021-01-521-6088	19200	13007894	COMPUTER, DIGITAL: BASIC LHMBC UOC: BN8 .....	1
2	PAOOO	5895-01-521-6922	19200	13007900	INTERFACE UNIT, DATA STORAGE SYSTEM: EXPANSION PACK, SAASM GPS MODULE, AND MODEM CARD UOC: BN8 .....	1
END OF FIGURE						

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**UNIT SUPPORT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTICS COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**SPECIAL TOOLS LIST**

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Not applicable.

## UNIT MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTICS COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

## NATIONAL STOCK NUMBER INDEX

## NOTE

Before proceeding with National Stock Number Index, see Introduction to RPSTL (WP 0044 00).

STOCK NUMBER	FIG.	ITEM
5895-01-518-9747	4	4
6145-01-521-4562	1	3
7021-01-521-6088	1	1
	5	1
6130-01-521-6090	3	1
7021-01-521-6092	2	1
7520-01-521-6095	3	4
5895-01-521-6922	1	2
	5	2

STOCK NUMBER	FIG.	ITEM
6130-01-521-6924	3	5
5895-01-521-7892	4	1
Basic LHMBC Cover Plate	3	2
Expansion Pack Cover Plate	4	2
GPS Antenna Connector Cvr	4	3
SD Cover	3	3

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**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTICS COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****PART NUMBER INDEX**

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**NOTE**

Before proceeding with Part Number Index, see Introduction to RPSTL (WP 0044 00).

<b>PART NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>
12992769	4	4
13007894	1	1
	5	1
13007895	2	1
13007898	3	5
13007899	3	4
13007900	1	2
	5	2

<b>PART NUMBER</b>	<b>FIG.</b>	<b>ITEM</b>
13007901	4	1
13007903	3	1
13007910	1	3
Basic LHMBC Cover Plate	3	2
Expansion Pack Cover Plate	4	2
GPS Antenna Connector Cvr	4	3
SD Cover	3	3

**CHAPTER 8**

**SUPPORTING INFORMATION**

**FOR**

**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**

**REFERENCES**

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**SCOPE**

This work package lists all Army regulations, field manuals, forms, pamphlets, technical bulletins, technical manuals, and miscellaneous publications referenced in this manual.

**ARMY REGULATIONS**

AR 735-11-2	Reporting Supply Discrepancies
AR 750-1	Army Materiel Maintenance Policy

**FIELD MANUALS**

FM 4-25-11	First Aid for Soldiers
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**FORMS**

DA Form 2028	Recommended Changes to Publications and Blank Forms
DA Form 2399-R	Computer's Record
DA Form 2409	Equipment Maintenance Log
MCO 4430.3	Report of Item and Packaging Discrepancies
MCO 4855.10	Quality Deficiency Report
MCO P4610.19	Transportation and Travel Record of Transportation Discrepancies
NAVMC 10772	Recommended Changes to Technical Publications
SF 361	Transportation Discrepancy Report
SF 364	Report of Discrepancy (ROD)
SF 368	Product Quality Deficiency Report

**PAMPHLETS**

DA PAM 738-750	Functional Users Manual for The Army Maintenance Management System (TAMMS)
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**TECHNICAL BULLETINS**

TB 43-0134	Battery Disposition and Disposal
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**TECHNICAL MANUALS**

TM 9-1220-246-12&P	Operator's and Organizational Maintenance Manual (Including Repair Parts and Special Tools List) for Mortar Ballistics Computer Set, M23
TM 11-5820-890-10-7	SINGARS ICOM Ground Radios Used With Automated Net Control

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**TECHNICAL MANUALS - Continued**

TM 750-244-7	Procedures for Destruction of Equipment to Prevent Enemy Use
TM 4700-15/1	Equipment Record Procedures

**MISCELLANEOUS PUBLICATIONS**

CTA 8-100	Army Medical Department Expendable/Durable Items
CTA 50-970	Expendable/Durable Items (Except: Medical, Class V, Repair Parts and Heraldic Items)

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**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****MAINTENANCE ALLOCATION CHART (MAC) INTRODUCTION**

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**INTRODUCTION****The Army Maintenance System MAC**

This introduction provides a general explanation of all maintenance and repair functions authorized at the two maintenance levels under the Two-Level Maintenance System concept.

The MAC (WP 0051 00) designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component shall be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on the MAC in column (4) as:

Field - Includes two subcolumns, Unit (C (Operator/Crew) and O (Unit)) maintenance and Direct Support (F) maintenance.

Sustainment - Includes two subcolumns, General Support (H) and Depot (D) maintenance.

The tools and test equipment requirements (immediately following the MAC) list the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from the MAC.

The remarks (immediately following the tools and test equipment requirements) contain supplemental instructions and explanatory notes for a particular maintenance function.

**Maintenance Functions**

Maintenance functions are limited to and defined as follows:

1. **Inspect.** To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel). This includes scheduled inspection and gaging and evaluation of cannon tubes.
2. **Test.** To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards on a scheduled basis, i.e., load testing of lift devices and hydrostatic testing of pressure hoses.
3. **Service.** Operations required periodically to keep an item in proper operating condition; e.g., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases. This includes scheduled exercising and purging of recoil mechanisms.
4. **Adjust.** To maintain or regulate, within prescribed limits, by bringing into proper position, or by setting the operating characteristics to specified parameters.
5. **Align.** To adjust specified variable elements of an item to bring about optimum or desired performance.
6. **Calibrate.** To determine and cause corrections to be made or to be adjusted on instruments of test, measuring, and diagnostic equipment used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.



## INTRODUCTION - Continued

### Maintenance Functions - Continued

7. Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.
8. Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the third position code of the Source, Maintenance and Recoverability (SMR) code.
9. Repair. The application of maintenance services, including fault location/troubleshooting, removal/installation, disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

### NOTE

The following definitions are applicable to the "repair" maintenance function:

Services - Inspect, test, service, adjust, align, calibrate, and/or replace.

Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or Unit Under Test (ET).

Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component, that is assigned as SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

Actions - Welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

10. Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.
11. Rebuild. Consists of those services/actions necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (e.g., hours/miles) considered in classifying Army equipment/components.

### Explanation of Columns in the MAC

Column (1) - Group Number. Column (1) lists FGC numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the Next Higher Assembly (NHA).

Column (2) - Component/Assembly. Column (2) contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

Column (3) - Maintenance Function. Column (3) lists the functions to be performed on the item listed in column (2). (For a detailed explanation of these functions refer to "Maintenance Functions" outlined above.)

Column (4) - Maintenance Level. Column (4) specifies each level of maintenance authorized to perform each function listed in column (3), by indicating work time required (expressed as manhours in whole hours or decimals) in the appropriate subcolumn. This work time figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function varies at different maintenance levels, appropriate work time figures are to be shown for each level. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the MAC. The symbol designations for the various maintenance levels are as follows:

Field:

- C - Operator or Crew maintenance
- O - Unit maintenance
- F - Direct Support maintenance

Sustainment:

- L - Specialized Repair Activity (SRA)
- H - General Support maintenance
- D - Depot maintenance

## NOTE

The "L" maintenance level is not included in column (4) of the MAC. Functions to this level of maintenance are identified by a work time figure in the "H" column of column (4), and an associated reference code is used in the REMARKS column (6). This code is keyed to the remarks and the SRA complete repair application is explained there.

Column (5) - Tools and Equipment Reference Code. Column (5) specifies, by code, those common tool sets (not individual tools), common Test, Measurement and Diagnostic Equipment (TMDE), and special tools, special TMDE and special support equipment required to perform the designated function. Codes are keyed to the entries in the tools and test equipment table.

Column (6) - Remarks Code. When applicable, this column contains a letter code, in alphabetical order, which is keyed to the remarks table entries.

### Explanation of Columns in the Tools and Test Equipment Requirements

Column (1) - Tool or Test Equipment Reference Code. The tool or test equipment reference code correlates with a code used in column (5) of the MAC.

Column (2) - Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

Column (3) - Nomenclature. Name or identification of the tool or test equipment.

Column (4) - National Stock Number (NSN). The NSN of the tool or test equipment.

Column (5) - Tool Number. The manufacturer's part number, model number, or type number.

### Explanation of Columns in the Remarks

Column (1) - Remarks Code. The code recorded in column (6) of the MAC.

Column (2) - Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC.

## UNIT MAINTENANCE

## LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32

(NSN 7021-01-521-1611, PN 13007892)

## MAINTENANCE ALLOCATION CHART (MAC)

## ARMY MAINTENANCE ALLOCATION CHART FOR XM32 LHMBC

Table 1. Army MAC for XM32 LHMBC.

(1)  GROUP NUMBER	(2)  COMPONENT/ASSEMBLY	(3)  MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL					(5)  TOOLS AND EQUIPMENT REF CODE	(6)  REMARKS CODE
			FIELD		SUSTAINMENT				
			UNIT		DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
			C	O	F	H	D		
00	M32 LHMBC	Inspect	1.3	3.0					
		Service	1.0						
		Test	1.0	3.0				1, 2, 3	
		Replace		0.6				2, 3	A
01	BASIC LHMBC	Inspect	0.2	0.5					
		Service	0.2						
		Test	0.2	0.5				1, 2, 3	
		Replace		0.1				2, 3	A
0101	RPDA 5500	Inspect	0.2	0.5					
		Service	0.2						
		Test	0.2	0.5				1, 2	
		Replace		0.1				2, 3	A
02	EXPANSION PACK	Inspect	0.2	0.5					
	SAASM GPS MODULE	Service	0.2						
		Test	0.1	0.5				1, 2	
		Replace		0.1				2, 3	A

## ARMY TOOLS AND TEST EQUIPMENT REQUIREMENTS FOR XM32 LHMBC

Table 2. Army Tools and Test Equipment for XM32 LHMBC.

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
1	O	Digital Multimeter	6625-01-265-6000	27W/ACCE
2	O	Pad, Electrostatic Discharge (with Equipment)	4940-01-250-4236	M87893B-02
3	O	Tool Kit, Electronic Equipment, TK-101/G	5180-00-064-5178	TK101GISSUE6

## ARMY REMARKS FOR XM32 LHMBC

Table 3. Army Remarks for XM32 LHMBC.

REMARKS CODE	REMARKS
A	Electrostatic discharge pad is required for the removal of the TCIM card, internal battery, and expansion pack hard drive.

**MARINE CORPS MAINTENANCE ALLOCATION CHART FOR BASIC LHMBC****Table 4. Marine Corps MAC for Basic LHMBC.**

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL				(5) TOOLS AND EQUIPMENT REF CODE	(6) REMARKS CODE
			UNIT	DIRECT SUPPORT	GENERAL SUPPORT	DEPOT		
				F	H	D		
00	M32 LHMBC	N/A						
01	BASIC LHMBC	Inspect	0.2				1, 2, 3 2, 3	A
		Service	0.1					
		Test	0.2					
		Replace	0.5					
0101	RPDA 5500	Inspect	0.1				1, 2, 3 2, 3	A
		Service	0.1					
		Test	0.1					
		Replace	0.3					
02	EXPANSION PACK SAASM GPS MODULE	N/A						

**MARINE CORPS TOOLS AND TEST EQUIPMENT REQUIREMENTS FOR BASIC LHMBC****Table 5. Marine Corps Tools and Test Equipment for Basic LHMBC.**

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL STOCK NUMBER	TOOL NUMBER
1	O	Digital Multimeter	6625-01-265-6000	27W/ACCE
2	O	Pad, Electrostatic Discharge (with Equipment)	4940-01-250-4236	M87893B-02
3	O	Tool Kit, Electronic Equipment, TK-101/G	5180-00-064-5178	TK101GISSUE6

**MARINE CORPS REMARKS FOR BASIC LHMBC****Table 6. Marine Corps Remarks for Basic LHMBC.**

REMARKS CODE	REMARKS
A	Electrostatic discharge pad is required for the removal of the TCIM card, internal battery, and expansion pack hard drive.

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**COMPONENTS OF END ITEM (COEI) AND BASIC ISSUE ITEMS (BII) LISTS (ARMY)/**  
**SUPPLY SYSTEM RESPONSIBILITY AND COLATERAL MATERIAL (MARINE CORPS)**

---

## **INTRODUCTION**

### **Scope**

This work package lists COEI and BII for the XM32 LHMBC to help you inventory items for safe and efficient operation of the equipment.

### **General**

**Army:** The COEI and BII information is divided into the following lists:

**Components of End Item (COEI).** This list is for information purposes only and is not authority to requisition replacements. These items are part of the XM32 LHMBC. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Items of COEI are removed and separately packaged for transportation or shipment only when necessary. Illustrations are furnished to help you find and identify the items.

**Basic Issue Items (BII).** These essential items are required to place the XM32 LHMBC in operation, operate it, and to do emergency repairs. Although shipped separately packaged, BII must be with the XM32 LHMBC during operation and when it is transferred between property accounts. Listing these items is your authority to request/requisition them for replacement based on authorization of the end item by the TOE/MTOE. Illustrations are furnished to help you find and identify the items.

**Marine Corps:** The items listed in this work package will be handled by Marine Corps personnel as follows:

**Supply System Responsibility.** This is a list, in alphabetical sequence, of items that are furnished with and must be turned in with the end item. Any item requiring replacement is the responsibility of the holding organization or using unit.

**Collateral Material.** This is a list, in alphabetical sequence, of items that are supplied with the initial issue of an end item and are retained by the unit.

**5th Echelon Rehabilitation Program.** Major items returned under this program will be evacuated under the provision(s) of the applicable Marine Corps Order(s) with items listed under "Supply System Responsibility." Rebuild and replacement under a 5th Echelon rehabilitation program will be limited to these items only. Those items under the heading "Collateral Material" and using unit items shall be held by holding organizations/using units for application to replacement end items.

### **Explanation of Columns in the COEI List and BII List**

**Column (1) - Illus Number.** Gives you the number of the item illustrated.

**Column (2) - National Stock Number (NSN).** Identifies the stock number of the item to be used for requisitioning purposes.

**Column (3) - Description, CAGEC, and Part Number.** Identifies the Federal item name (in all capital letters) followed by a minimum description when needed. The stowage location of COEI and BII is also included in this column. The last line below the description is the CAGEC (Commercial and Government Entity Code) (in parentheses) and the part number.

**Column (4) - Usable On Code.** When applicable, gives you a code if the item you need is not the same for different models of equipment.

**Column (5) - Unit of Measure (U/M).** Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (2).

**Column (6) - Qty Rqr.** Indicates the quantity required.

## COMPONENTS OF END ITEM LIST (ARMY)/SUPPLY SYSTEM RESPONSIBILITY LIST (MARINE CORPS)

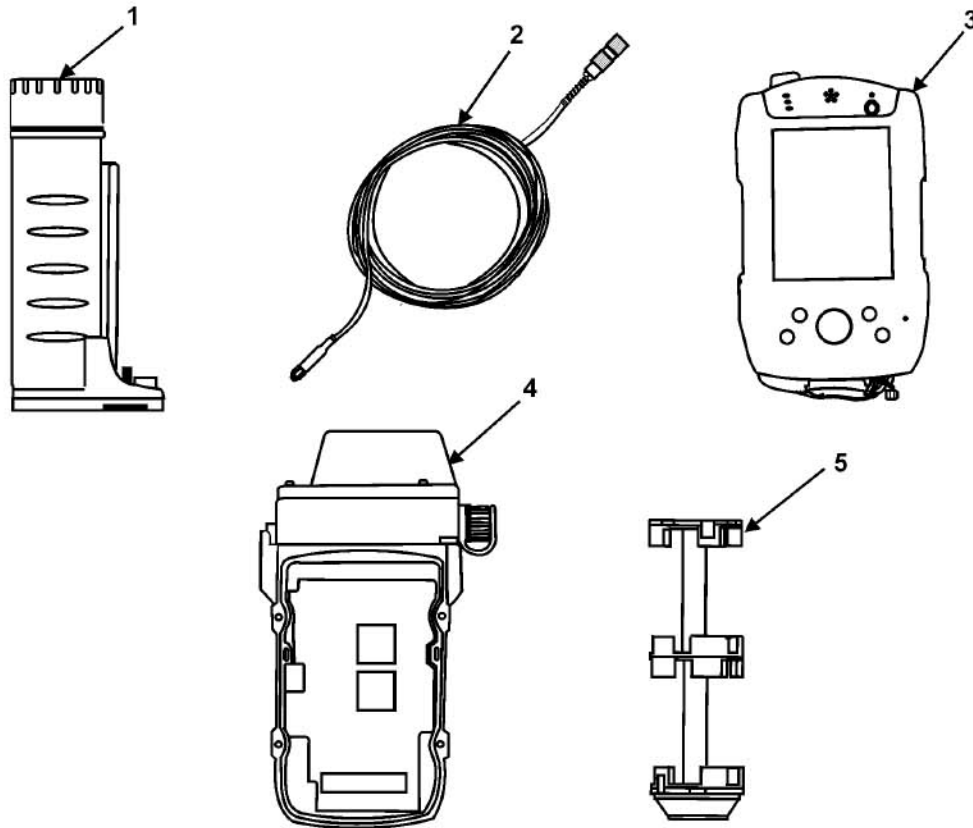


Table 1. Components of End Item List (Army)/Supply System Responsibility List (Marine Corps).

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) U/M	(6) QTY RQR
1	6160-01-521-6091	BATTERY BOX: Also called Battery Adapter (19200) 13007896		EA	1
2	6145-01-521-4562	CABLE, RADIO FREQUENCY: (Army only) (19200) 13007910		EA	1
3	7021-01-521-6092	COMPUTER, DIGITAL: Portable RPDA5500 (19200) 13007895		EA	1
4	5895-01-521-6922	INTERFACE UNIT, DATA STORAGE SYSTEM: Expansion Pack, SAASM GPS Module with TACLINK (Army only) (19200) 13007900		EA	1
5	6160-01-521-4563	TRAY, BATTERY: Accommodates 10 batteries, 5.020 in. nom lg, 1.540 in. nom dia (Also called Battery Holder) (19200) 13007897		EA	1

## BASIC ISSUE ITEMS LIST (ARMY)/COLLATERAL MATERIAL LIST (MARINE CORPS)

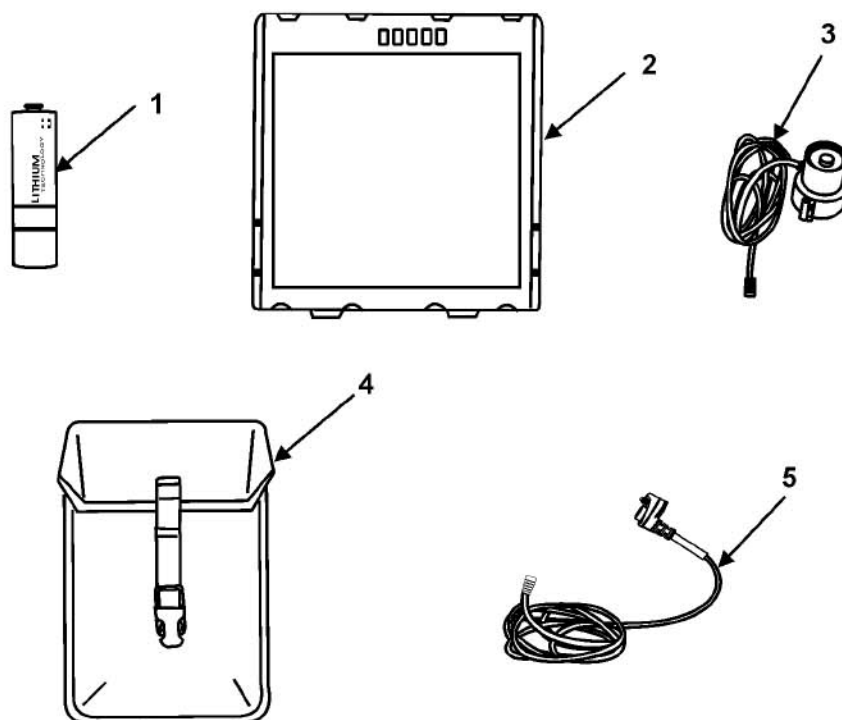


Table 2. Basic Issue Items List (Army)/Collateral Material List (Marine Corps) .

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) U/M	(6) QTY RQR
1	6135-01-333-6101	BATTERY, NONRECHARGEABLE: LITHIUM, 1.5 VOLTS, 0.563 IN. NOM OA DIA, SIZE AA (83740) L91		EA	AR
2	6130-01-521-6924	BATTERY POWER SUPPLY: RPDA Internal Battery (19200) 13007898		EA	1
3	6145-01-521-4564	CABLE, POWER, ELECTRICAL: NATO DC/DC Converter Cable (19200) 13007909		EA	1
4	7045-01-521-6923	CASE, COMPUTER: 2.000 in. nom lg, 8.500 in. nom h, Soft Field Case (19200) 13007904		EA	1
5	TBD	DC/DC RPDA POWER CABLE		EA	1

## BASIC ISSUE ITEMS LIST (ARMY)/COLLATERAL MATERIAL LIST (MARINE CORPS) - Continued

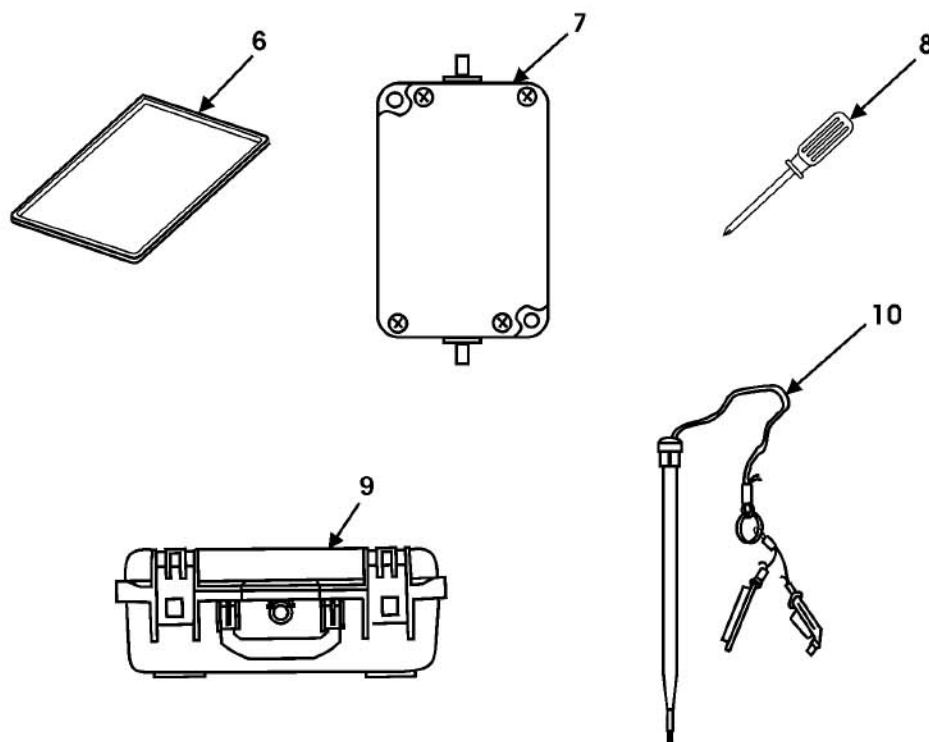


Table 2. Basic Issue Items List (Army)/Collateral Material List (Marine Corps) - Continued.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) U/M	(6) QTY RQR
6	6230-01-521-6098	FILTER, LIGHT, GENERAL PURPOSE: NVG Filter (19200) 13007906		EA	1
7	TBD	RPDA DC/DC CONVERTER		EA	1
8	5120-00-820-2995	SCREWDRIVER, CROSS TIP: Plastic handle, steel blade, type 1 and class 3 (05047) B107.30		EA	1
9	8145-01-521-6925	SHIPPING AND STORAGE CONTAINER, COMMUNICATION EQUIPMENT: Rectangular, 18.250 in. nom oa lg, 13.880 in. ao w, and 6.75 in. nom oa h (19200) 13007905		EA	1
10	7520-01-521-6095	STYLUS, DUPLICATING STENCIL: Connector Covers provided (19200) 13007899		EA	1



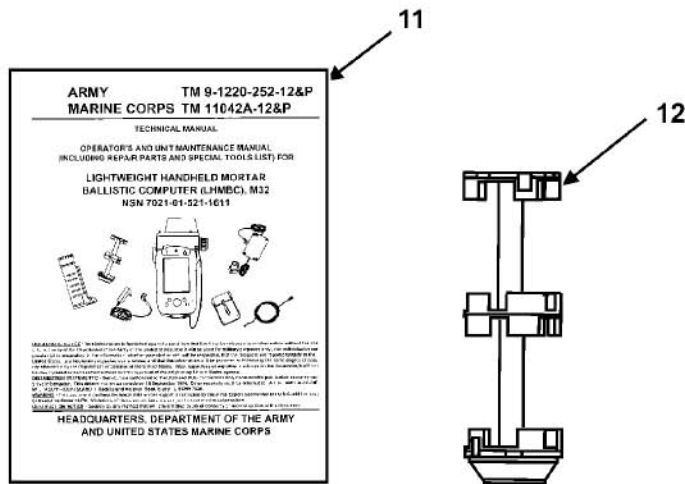


Table 2. Basic Issue Items List (Army)/Collateral Material List (Marine Corps) - Continued.

(1) ILLUS NUMBER	(2) NATIONAL STOCK NUMBER	(3) DESCRIPTION, CAGEC, AND PART NUMBER	(4) USABLE ON CODE	(5) U/M	(6) QTY RQR
11	N/A	TECHNICAL MANUAL, TM 9-1220-252-12&P/ TM 11042A-12&P		EA	1
12	6160-01-521-4563	TRAY, BATTERY: Accommodates 10 batteries, 5.020 in. nom lg, 1.540 in. nom dia (Also called Battery Holder) (19200) 13007897		EA	1

**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**ADDITIONAL AUTHORIZATION LIST (AAL) (ARMY)/**  
**USING UNIT RESPONSIBILITY LIST (MARINE CORPS)**

## INTRODUCTION

### Scope

This work package lists additional items you are authorized for the support of the M32 LHMBC.

### General

**Army:** Additional Authorization List. This list identifies items that do not have to accompany the LHMBC and that do not have to be turned in with it. These items are all authorized to you by CTA, MTOE, TDA, or JTA.

**Marine Corps:** Using Unit Responsibility List. This list identifies, in alphabetical sequence, items that will not be issued with the end item. They must be requisitioned, as required, through the supply system by the holding organization or the using unit.

### Explanation of Columns in the AAL

Column (1) - National Stock Number (NSN). Identifies the stock number of the item to be used for requisitioning purposes.

Column (2) - Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). Identifies the Federal item name (in all capitals) followed by a minimum description when needed. The last line below the description is the CAGEC (in parentheses) and the part number.

Column (3) - Usable On Code. When applicable, gives you a code if the item you need is not the same for different models of equipment.

Column (4) - Unit of Measure (U/M). Indicates the physical measurement or count of the item as issued per the National Stock Number shown in column (1).

Column (5) - Qty Recm. Indicates the quantity recommended.

### ADDITIONAL AUTHORIZATION LIST (ARMY)/USING UNIT RESPONSIBILITY LIST (MARINE CORPS)

**Table 1. Additional Authorization List (Army)/Using Unit Responsibility List (Marine Corps) .**

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION, CAGEC, AND PART NUMBER	(3) USABLE ON CODE	(4) U/M	(5) QTY RECM
5985-01-375-4660	ANTENNA: External GPS Antenna (Army only) (OUVG2) AT575-030		EA	1
6150-01-521-6096	CABLE ASSEMBLY, POWER, ELECTRICAL: Two Wire Cable (Army only) (19200) 13007911		EA	1

# **ADDITIONAL AUTHORIZATION LIST (ARMY)/USING UNIT RESPONSIBILITY LIST (MARINE CORPS) - Continued**

**Table 1. Additional Authorization List (Army)/Using Unit Responsibility List (Marine Corps) - Continued.**

(1) NATIONAL STOCK NUMBER	(2) DESCRIPTION, CAGEC, AND PART NUMBER	(3) USABLE ON CODE	(4) U/M	(5) QTY RECM
5595-01-098-2613	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL, BRANCHED: (Vehicle Battery Cable) (Army only) (80063) SM-D-875489		EA	1
5995-01-098-7077	CABLE ASSEMBLY, SPECIAL PURPOSE, ELECTRICAL: ELECTROSTATIC SENSITIVE (Radio Rack Cable) (Army only) (80063) SM-D-917637		EA	1
TBD	EXTERNAL GPS ANTENNA CABLE (Army only)		EA	1
7025-01-523-7631	MEMORY CARD, PERSONAL COMPUTER: w/LHMBC Software (19200) 13005792		EA	2
6160-01-385-4358	TRAY, BATTERY: Accommodates quantity of 8 (13499) 221-0135-020		EA	1
TBD	“Y” POWER CABLE (Army only)		EA	1

**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**EXPENDABLE AND DURABLE ITEMS LIST**

## INTRODUCTION

### Scope

This work package lists expendable and durable items that you will need to operate and maintain the LHMBC. This list is for information only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (Except: Medical, Class V, Repair Parts and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

### Explanation of Columns in the Expendable/Durable Items List

Column (1) - Item Number. This number is assigned to the entry in the list and is referenced in the narrative instructions to identify the item (e.g., Use soft cloth (WP 0054 00)).

Column (2) - Level. This column identifies the lowest level of maintenance that requires the listed item (C = Operator/Crew, O = Unit).

Column (3) - National Stock Number (NSN). This is the NSN assigned to the item which you can use to requisition it.

Column (4) - Item Name, Description, Commercial and Government Entity Code (CAGEC), and Part Number (P/N). This column provides the other information you need to identify the item.

Column (5) - Unit of Measure (U/M). This code shows the physical measurement or count of an item, such as gallon, dozen, gross, etc.

## EXPENDABLE AND DURABLE ITEMS LIST

**Table 1. Expendable and Durable Items List .**

(1)  ITEM NUMBER	(2)  LEVEL	(3)  NATIONAL STOCK NUMBER	(4)  ITEM NAME, DESCRIPTION, CAGEC, PART NUMBER	(5)  U/M
1	C	6135-00-985-7845	Battery, Nonrechargeable: Alkaline, 1.5 volts, AA cell size (80058) BA-3058/U	EA
2	C	6135-01-333-6101	Battery, Nonrechargeable: Lithium, 1.5 volts, 0.563 in. nom oa dia (83740) L-91	EA
3	C	6140-01-467-3225	Cell, Battery: AA, Rechargeable, Nickel Metal Hydride (83740) NH15BP-2	EA
4	C	8305-00-267-3015	Cloth, Cheesecloth: White both sides, unshrunk, type 2, class 2 (81348) CCCC440	YD

**EXPENDABLE AND DURABLE ITEMS LIST - Continued****Table 1. Expendable and Durable Items List - Continued.**

(1)  ITEM NUMBER	(2)  LEVEL	(3)  NATIONAL STOCK NUMBER	(4)  ITEM NAME, DESCRIPTION, CAGEC, PART NUMBER	(5)  U/M
5	C	7690-01-521-6094	Decal Set: LED Blackout Sticker Kit (19200) 13007907	EA
6	C	TBD	Gasket Kit	EA
7	C	TBD	Hot Button Sticker	EA
8	O	5330-00-966-8657	Packing Assortment, Preformed (9N846) RUS380	EA
9	O	TBD	SD Cover Sticker	EA

**OPERATOR MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****AUTHORIZED MUNITIONS****GENERAL**

This work package provides information on the cartridge and weapon system combinations that are authorized to compute firing solutions using the LHMBBC software.

**AUTHORIZED MUNITIONS****NOTE**

The munitions in table 1 represent the authorized combinations of cartridges and weapon systems known at the time of the LHMBBC software release. The same list is in the ballistic kernel, making it possible to compute firing solutions for these combinations. Any current restrictions for the cartridges/weapon systems take precedence and must be followed.

**Table 1. Authorized Munitions .**

<b>MODEL</b>	<b>FUZE</b>	<b>TYPE</b>	<b>CALIBER</b>	<b>WEAPONS</b>
TRN M50A3	M525	HE	60MM	M19 M224
TRN M50A3	M935	HE	60MM	M19 M224
IL M83A3	M65A1	IL	60MM	M19 M224
WP M302A1	M527	WP	60MM	M19 M224
WP M302A2	M936	WP	60MM	M19 M224
HE M720	M734	HE	60MM	M224
HE M720A1	M734A1	HE	60MM	M224
IL M721	M776	IL	60MM	M224
WP M722	M745	WP	60MM	M224
TRN M766	M779	HE	60MM	M224
IR M767	M776	IR	60MM	M224
HE M768	M783	HE	60MM	M224
TRN M769	M775	HE	60MM	M224
HE M888	M935	HE	60MM	M224
WP M722A1	M783	WP	60MM	M224
TRN M1	None	HE	81MM	M29A1 M252
HE M374	M524	HE	81MM	M29A1 M252 M303
HE M374	M532	HE	81MM	M29A1 M252 M303
HE M374	M567	HE	81MM	M29A1 M252 M303
HE M374A2	M524	HE	81MM	M29A1 M252 M303
HE M374A2	M532	HE	81MM	M29A1 M252 M303
HE M374A2	M567	HE	81MM	M29A1 M252 M303
HE M374A3	M524	HE	81MM	M29A1 M252 M303

**AUTHORIZED MUNITIONS - Continued****Table 1. Authorized Munitions - Continued.**

<b>MODEL</b>	<b>FUZE</b>	<b>TYPE</b>	<b>CALIBER</b>	<b>WEAPONS</b>
HE M374A3	M532	HE	81MM	M29A1 M252 M303
HE M374A3	M567	HE	81MM	M29A1 M252 M303
WP M375	M524	WP	81MM	M29A1 M252 M303
WP M375	M532	WP	81MM	M29A1 M252 M303
WP M375	M567	WP	81MM	M29A1 M252 M303
WP M375A2	M524	WP	81MM	M29A1 M252 M303
WP M375A2	M532	WP	81MM	M29A1 M252 M303
WP M375A2	M567	WP	81MM	M29A1 M252 M303
WP M375A3	M524	WP	81MM	M29A1 M252 M303
WP M375A3	M532	WP	81MM	M29A1 M252 M303
WP M375A3	M567	WP	81MM	M29A1 M252 M303
IL M301A3	M84A1	IL	81MM	M29A1 M252 M303
HE M889	M935	HE	81MM	M252
HE M889A1	M935	HE	81MM	M252
HE M821	M734	HE	81MM	M252
HE M821A1	M734	HE	81MM	M252
HE M821A2	M734A1	HE	81MM	M252
RP M819	M772	WP	81MM	M252
IL M853A1	M772	IL	81MM	M252
IR M816	M772	IR	81MM	M252
TRN M879	M751	HE	81MM	M252
TRN M880	M775	HE	81MM	M29A1 M252 M303
HE M57	M935	HE	120MM	M120
IL M91	M776	IL	120MM	M120
HE M933	M745	HE	120MM	M120 M121 RMS6L
HE M934	M734	HE	120MM	M120 M121 RMS6L
HE M934A1	M734A1	HE	120MM	M120 M121 RMS6L
WP M929	M734A1	WP	120MM	M120 M121 RMS6L
WP XM929	M745	WP	120MM	M120 M121 RMS6L
IL M930	M776	IL	120MM	M120 M121 RMS6L
IR XM983	M776	IR	120MM	M120 M121 RMS6L
TRN M931	M781	HE	120MM	M120 M121 RMS6L
IL M930E1	M776	IL	120MM	M120 M121 RMS6L

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**OPERATOR MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**RADIO/FORWARD OBSERVER SYSTEM (FOS) SETUP**

---

## GENERAL

This work package has setup information for the FOS Version 12 and Version 7 for communicating with the LHMBC. It also contains the information needed to set up the radio and Forward Observer System (FOS) two wire for digital missions.

The radio information is for setting up the single-channel ground and airborne radio system (SINCGARS) radios to allow digital communication between the LHMBC and other communications devices. Refer to TM 11-5820-890-10-7 for further information.

## FOS VERSION 12 AND VERSION 7

### NOTE

A Subsequent Adjust message sent with SA Coords from the FOS is not supported by the LHMBC software. The following Alert will appear: "CANTPRO--SA Coords Unsupported." This occurs with the FOS and is not applicable to AFATDS.

## 12 Series FOS Versions

The LHMBC V2.1 requirement is to communicate with the 12 series of FOS versions.

- a. There are no issues with the 12 series of FOS versions communicating with the LHMBC.
- b. FOS Protocol: 188-220A and Device Type BCS are the only available choices.

## 7 Series FOS Versions

The LHMBC will communicate with the 7.1 series of FOS, if the FOS is set up correctly. If the FOS is not set up correctly, the following may occur.

FOS 7.1 Versions - Correct Setup Data		
Member Data Device Type for LHMBC	Protocol	Message Set
BCS	188-220A	Pkg 11 (R2)
BCS-FSV7	188-220C	R5

- a. FOS: V7.01.08 - **CORRECT** FOS setup for communicating with the LHMBC.  
Member Data: LHMBC BCS Device Type  
Protocol: 188-220A
- b. FOS: V7.01.08 - **INCORRECT** setup at the FOS.  
Member Data: LHMBC BCS - FSV7 Device Type  
Protocol: 188-220A
  - (1) Send a PTM or Grid Mission to LHMBC Version 2.1, any message.
  - (2) The LHMBC software will go to the operating system. You will be required to restart the LHMBC software.



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**FOS VERSION 12 AND VERSION 7 - Continued****7 Series FOS Versions - Continued**

- c. FOS: V7.01.08 - **INCORRECT** setup at the FOS.  
Member Data: LHMBC BCS - FSV7 Device Type  
Protocol: 188-220C  
  
(1) Send any message to LHMBC.  
(2) The LHMBC receives the error Alert "Received message with invalid IP Add 032.056.152.000 from 044.254.185.024".
- d. FOS: V7.01.08 - **INCORRECT** setup at the FOS.  
Member Data: BCS Device Type  
Protocol: 188-220C

The FOS will not allow. FOS receives inconsistent entries for device type and channel fields member record will be deleted.

**RADIO SETUP****LHMBC Communications Setup**

Connect commo cable from LHMBC to radio.

**NOTE**

Radio setup procedures may vary according to tactical situation and/or mission requirements. For assistance, refer to unit Standard Operating Procedures (SOP), SINCGARS technical manuals, and communication specialist.

**SINCGARS RT-1523E (ASIP) Setup**

1. Turn on VAA AM7239E.
2. Turn on SINCGARS radio by turning FCTN knob to TST. Wait until "Good" is displayed.
3. Turn FCTN knob to LD. Wait until frequency is displayed.
4. Press MENU/CLR button. This will guide operator through the settings.
5. Set Volume preference (1 - 9); press MENU/CLR button.
6. Set Channel (Channels 1 - 6) by pressing a number from the 1-6 keys; press MENU/CLR button.
7. Choose Power preference (L (low), M (medium), HI (high), PA (power amp)) by pressing CHG 7; press MENU/CLR button.
8. Set MODE to SC (Single Channel); press MENU/CLR button.
9. Set COMSEC to PT (Plain Text); press MENU/CLR button.

10. Set the desired frequency:
  - a. Select FREQ key on keypad.
  - b. Press MENU/CLR button.
  - c. Enter frequency and press STO on each radio. Ensure that frequency is the same for all radios.
11. Set DATA Status (DATA is key #4):
  - a. Select DATA key on keypad.
  - b. Select data rate (baud) by pressing the CHG key (CHG is key #7) so agreement exists between radio and computer.
  - c. Ensure that Data Status is the same for both radios.
12. Turn FCTN knob to Squelch OFF position.
13. The radio should now be ready for digital communications.

### **SINGARS RT-1523 A/B/C/D Setup**

#### **CAUTION**

If applicable, ensure that SINGARS radio(s) are in STANDBY mode prior to starting vehicle to avoid possible damage to communications equipment.

1. Turn on VAA AM7239E.
2. Turn on SINGARS radio by turning the FCTN knob to TST.
3. Set Channel knob to MAN (channels 1 - 6).
4. Set POWER knob to L (low), M (medium), HI (high), or PA (power amp), depending on the radio system.
5. Set MODE knob to SC (Single Channel).
6. Set COMSEC knob to PT (Plain Text).
7. Set FCTN knob to LD position.
8. Set the desired frequency:
  - a. Select FREQ key on keypad.
  - b. Press CLR.
  - c. Enter frequency and press STO, on each radio. Ensure that frequency is the same for both radios.

**RADIO SETUP - Continued****SINGARS RT-1523 A/B/C/D Setup - Continued**

9. Set the DATA Status:
  - a. Select DATA key (DATA is key #4) on keypad.
  - b. Select data rate (baud) so that agreement exists between radio and computer.
  - c. Ensure that Data Status is the same for both radios.
10. Set radio to ON position.
11. The radio should now be ready for digital communications.

**Power Down Procedure (for Later Operations)**

1. Set radio FCTN knob to STANDBY position.
2. Turn VAA off.
3. Ensure that all internal communications are powered off.

**Power Down Procedure (Complete)**

1. Set radio FCTN knob to OFF position.
2. Turn VAA off.
3. Ensure that all internal communications are powered off.

**Forward Observer System (FOS) Communications Setup****NOTE**

In order to communicate with the FO, Forward Observer System (FOS) will be setup as described. The following location data is to be used for example only.

1. Press the "J" key (FED STATUS). Then press "B"; the NET STATUS screen will be displayed (Note: Data values will not necessarily match those shown.).

**NET STATUS**

CONNECTION	SINGARS RADIO (or 2 WIRE, if desired)
BLOCK	SINGLE
PREAMBLE	1.4
RATE	1200
DELAY	1.0 00:00:00

2. Setup the Subscriber Data in the FOS to agree with Subscriber Data in the LHMBC.

3. Be sure to set communications parameters on the FOS as detailed in the Communications Setup for the LHMBC:

NETWORK ID	(e.g., A for Channel A)
SUBSCRIBER TYPE	FO
DEVICE TYPE	BCS
SUBSCRIBER ID	Any 4 character set (2 alpha, 2 numeric)

## FOS TWO WIRE SETUP

### FSO/CDR Mode Menu

### NOTE

If using the FOS radio and not using the two wire adapter, some of the settings will need to be changed to be able to communicate digitally. For example, on the Net Status List screen, changing the Connection to SINCGARS SIP automatically changes other information.

Enter the following information:

### Setup

DATE SET: <b>17/03/99</b>	PRINTER STATUS: <b>OFF</b>
TIME SET: <b>16:25:40</b>	
TIME ZONE: <b>Z</b>	VMF MSG HEADER:
DAYLIGHT SAVING: <b>YES</b>	OP MODE: <b>OPER</b>
OOP TEST: <b>000 min</b>	CLASS: <b>UNCL</b>
OBSERVER: <b>01</b>	
ADDRESS: <b>A</b>	
UNIT: <b>F/O/1/</b>	
URN: <b>0000617</b>	
KEY BELL VOLUME: <b>5</b>	
MSG BELL VOLUME: <b>3</b>	
ILLEGAL ENTRY BELL: <b>0</b>	
DISPLAY DELAY: <b>0.4</b>	
CPH TIMER MOD: <b>05SEC</b>	
HF TIMER MOD: <b>05SEC</b>	
LASER INFO:	
G/VLLD CODE: <b>N/G</b>	
CLOUD HEIGHT: <b>N/G</b>	
VISIBILITY: <b>N/G</b>	

### NET Status List

NET	CONNECTION	PROTOCOL	MODULATION
<b>A1</b>	<b>TWO WIRE</b>	<b>188-220A</b>	<b>FSK 188C</b>
<b>A2</b>			

**FOS TWO WIRE SETUP - Continued****FSO/CDR Mode Menu - Continued****NET Status Menu**

CONNECTION: **TWO WIRE**  
 PROTOCOL: **188-220A**  
 MODULATION: **FSK-188C**  
 BAUD RATE: **1200**  
 IP ADDRESS: **130.139.112.040**  
 RANK: **02**  
 NUMBER OF STATIONS: **03**

NET STATUS: **LOADING/READY**  
**LOADING INDICATOR**

: **DADNAP**  
 : **NORMAL**  
 : **NORMAL**  
 : **O.BM**  
 : **FEC/TDC**

**Member Data Summary****NOTE**

This is the FDC address.

UNIT ID	ADR	NET	MODE	ROUTE TO
<b>A F/D/C/</b>	<b>F</b>	<b>1</b>	<b>AUTO</b>	
<b>B</b>				

**Member Data****NOTE**

This is the FDC data.

ADDRESS: **F**  
 RELAY TYPE: **NONE**  
 NET: **1**  
 DEVICE: **BCS**  
 UNIT: **F/D/C/**  
 URN: **0000612**

EASTING: **\_\_**  
 NORTHING: **\_\_**  
 ALT: **\_\_\_\_ M**  
 GRID ZONE: **STD**  
 G/VLLD CODE: **N/G**  
 CLOUD HEIGHT: **N/G**  
 VISIBILITY: **N/G**  
 SERIAL NUMBERS:  
   NEXT XMIT: **00**  
   NEXT RCV: **02**  
 XMIT STAT: **NORMAL**

UPDATE MODE: **AUTO**

IP ADDRESS: **130.139.112.031**

## Self Location

### NOTE

This is the FO data.

FOS LOCATION	FOS UTM LOCATION
EASTING: <b>15653</b>	UTM ZONE NO: <b>16</b>
NORTHING: <b>90443</b>	UTM ZONE?
ALT: <b>0175</b>	UTM AREA?
GRID ZONE: STD	

## Map Modification Data

MINIMUM EASTING: **687000**  
MAXIMUM EASTING: 786999  
MINIMUM NORTHING: **0356900**  
MAXIMUM NORTHING: 03668999  
GRID ZONE: **016**  
ELLIPSOID: **WSG**  
DATUM: **WGS 84**

## Auto Target Numbering

TARGET NUMBERING: **ON**  
TARGET NUMBER PREFIX: **AB**  
STARTING TARGET NUMBER: **0001**  
ENDING TARGET NUMBER: **0100**  
NEXT TARGET NUMBER: **0001**

**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**ERROR AND WARNING MESSAGES**

## INTRODUCTION

This WP contains messages (errors, warnings, other messages) that may be displayed when operating the LHMBC. There are three sections: operating system, LHMBC software, and Ballistic Kernel. The messages that are self-explanatory and require no further explanation are NOT included in this WP. A “%s” is a placeholder for information that will be supplied at the time the message is generated.

## OPERATING SYSTEM

**Table 1. Operating System Messages.**

TYPE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
Information	Unrecognized Card. Enter the name of the device driver for this card. For information, see the card manufacturer's documentation.	Poor expansion pack connection, or faulty modem card, GPS, or expansion pack.	See Troubleshooting (WP 0034 00).
Information	Main Battery Low		See Power Management (WP 0005 00).
Information	External Battery Low		See Power Management (WP 0005 00).
Information	Expansion Pack initialization failed. Please contact your Expansion Pack Manufacturer.		See Troubleshooting (WP 0034 00).
Information	An encrypted card has been detected. Do you want to encrypt it?	SD memory card left in SD slot.	DO NOT ENCRYPT. Unit maintenance needs to remove SD memory card.

## LHMBC SOFTWARE

**Table 2. LHMBC Software Messages .**

TYPE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
Warning	WARNING 6 SIGHTINGS RECOMMENDED, OVERRIDE?	For mean point impact at least six sightings are recommended.	
Error	NO NON OPOUT GUNS IN UNIT	No guns are operational.	Ready guns and retry Compute FU Center.
Error	RELOT FAILED AIMPOINT UNCHANGED %s	Unable to calculate new aimpoint for adjustment. Aimpoint remains constant.	
Error	CANNOT BUILD & SEND MTO DENY	Unexpected software problem occurred.	Note error, continue operations by voice, and file Software Trouble Report when able.
Error	CANNOT CHANGE POSITION DURING ACTIVE MISSION	Function not available while mission is active.	Wait until mission is ended and retry function.

**LHMBC SOFTWARE - Continued****Table 2. LHMBC Software Messages - Continued.**

<b>TYPE</b>	<b>MESSAGE</b>	<b>POSSIBLE CAUSE</b>	<b>CORRECTIVE ACTION</b>
Error	CANNOT PROCESS %s	Message is invalid or unreadable.	Note error, continue operations by voice, and file Software Trouble Report when able.
Error	DATUM CONVERSION FAILED	Entered positions could not be converted to current map mod grid zone and datum.	Verify coordinates are correct.
Error	FO LIMIT HAS BEEN REACHED	Maximum of 25 entries has been reached.	Delete unused entries and retry.
Error	ERROR ADDING DATA TO TABLE	Error when adding new target or known point.	Note error, continue operations by voice, and file Software Trouble Report when able.
Warning	POSITION NOT CREATED SUCCESSFULLY	Problem occurred when creating position. All entries should be checked for correctness.	
Warning	ALL MISSIONS ARE FULL	Cannot create mission when full. Total of six missions is allowed.	
Warning	POSITION NOT CLEARED SUCCESSFULLY	Error occurred while clearing information.	Note error, continue operations by voice, and file Software Trouble Report when able.
Error	LOOKUPS FAILED	Problem occurred with database initialization of Lookup Table.	Reinstall software.
Error	NO FPF BUFFER AVAILABLE	Maximum of three FPF missions allowed.	Delete unused entries and retry.
Exclamation	WEAPON MODEL CHANGED. AMMO OF WRONG TYPE WILL BE DELETED, DO YOU WANT TO CONTINUE?	Ammunition previously assigned incompatible with new weapon type.	When changing weapon model, delete ammunition previously assigned that is incompatible with new weapon type.
Error	SEARCH&TRAVERSE INFO NOT COMPLETED	Data field missing or value not selected.	Data for Search & Traverse should be completed by pressing S&T control button on Mission Data screen.
Question	CONFIRM OCTANT 9 USE LOCATION AS STATION NAME	When using Octant 9 in MET, location is used as Station Name.	Station Name will be blanked out.
Error	THE OBSERVER TO MPI LINES DO NOT INTERSECT	Unable to calculate new aimpoint for adjustment using FO angle given.	
Error	SUBSCRIBER LIMIT HAS REACHED	Maximum of 80 entries has been reached.	Delete unused entries and retry.
Error	TARGET NUMBER PREFIX MUST BE 2 ALPHA CHARACTERS	Entered data is not in proper format.	Re-enter data in format given in error message.
Error	UNABLE TO BUILD OBSERVER NOTIFICATION MSG	Unexpected software problem occurred.	Note error, continue operations by voice, and file Software Trouble Report when able.



**Table 2. LHMBC Software Messages - Continued.**

TYPE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
Error	UNABLE TO BUILD ON CALL FIRE COMMAND	Unexpected software problem occurred.	Note error, continue operations by voice, and file Software Trouble Report when able.
Error	ONCE RAISED THE SYSTEM SECURITY CLASSIFICATION CANNOT BE LOWERED	Security level cannot be lowered once it is raised.	See WP0040 00 for procedures to lower security level.
Error	YOU DO NOT HAVE PERMISSION TO RAISE SECURITY CLASSIFICATION	Proper permission is required to raise security level.	Software error. File Software Trouble Report and continue operations.
Error	YOU SHOULD NOT BE ABLE TO GET HERE	System error occurred and code execution should not have gotten here.	Software error. File Software Trouble Report and continue operations.
Error	TARGET LIST FULL. DO YOU STILL WANT TO END THE MISSION?	Cannot <b>Save As Target</b> because maximum targets of 50 has been reached.	
Error	UNABLE TO COMPUTE REG CORRECTIONS, NO GUN ASSIGNED. DO YOU STILL WANT TO END THE MISSION?	Registration data will not be stored unless correct guns are placed in mission before EOM.	
Question	KNOWN POINT LIST FULL. DO YOU STILL WANT TO END THE MISSION?	When known point list is full (50 KPs) no information can be stored so verification of EOM is required.	
Warning	UNABLE TO AUTO SELECT LOT FOR REQUESTED AMMO	Sub Adj requested for lot is not in inventory.	

**BALLISTIC KERNEL****Table 3. Ballistic Kernel Messages.**

TYPE	MESSAGE	POSSIBLE CAUSE	CORRECTIVE ACTION
Warning	Rounds may cross		

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**UNIT MAINTENANCE****LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32****(NSN 7021-01-521-1611, PN 13007892)****WARRANTY INFORMATION**

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**GENERAL**

This work package provides warranty information for the M32 LHMBC. Part 1 is applicable to hardware fielded prior to 1 August 2005. Part 2 is applicable to hardware fielded after 1 August 2005.

**PART 1 - WARRANTY INFORMATION (HARDWARE FIELDED PRIOR TO 1 AUGUST 2005)**

A contract warranty is provided on the M32 LHMBC. The unit is responsible for shipping a failed Line Replaceable Unit (LRU) to the assigned address. The replacement to the unit will be returned using the same shipping method or better. If after receiving the faulty LRU it is determined the failure was caused by misuse/abuse, it will be reported to the unit. The unit will have 30 days after being notified to decide whether to have the LRU repaired or have it returned. If the unit is aware that the cause of the failure is misuse/abuse, the unit is not required to return the equipment.

The unit must call for a Return Material Authorization (RMA) number before shipping the failed LRU to the contractor.

POC for returned item: Janet Towndrow  
Talla Tech Corporation  
2031 East Paul Dirac Drive  
Suite 236  
Tallahassee, FL 32310  
1-850-580-0420

Refer to Purchase Order # (this information is provided at handoff)

**NOTE**

All M32 LHMBC components are considered under warranty and are authorized to be returned, if desired.

**PART 2 - WARRANTY INFORMATION (HARDWARE FIELDED AFTER TO 1 AUGUST 2005)****Hardware Warranty**

The M32 LHMBC is purchased from PM Common Hardware Systems (PM CHS). The contract includes a 72-hour return/replacement, 24-hour hotline and regional/satellite support centers located worldwide. Warranty period will depend on when the M32 LHMBC was purchased and the warranty period will be provided at the time of fielding (at time of procurement, the warranty period is 5 years on the M32 LHMBC major components). The warranty is administered by PM CHS through its contractor General Dynamics, GDC4S.

All M32 LHMBC hardware, cables, and ancillary equipment are covered by the warranty. A warranty failure is defined as the failure of a warranted item to perform in accordance with its product specification. A warranty failure does not include failures caused by:

Any associated or complementary equipment or operational software not furnished with the M32 LHMBC.

Misuse, neglect, failure to provide necessary preventative maintenance (PMCS), abuse or accident to the equipment or combat.

Any modifications to the equipment.

Exposure of the equipment to conditions beyond the environmental, power and operating constraints specified in the government approved product specifications.

**PART 2 - WARRANTY INFORMATION (HARDWARE FIELDIED AFTER TO 1 AUGUST 2005) - Continued****Warranty Repair Procedure**

Repairs/replacement of failed items will be accomplished within 72 hours (excluding holidays and weekends) of receipt of items at the Regional Support Center (RSC), which will return the replaced/repared items to the sending activity by the same or faster mode of shipment used by the sender. The shipping time does not factor into the 72 hour turn-around-time (TAT).

The following steps should be taken when turning in failed/defective items for warranted repair:

1. User/operator completes maintenance request (DA Form 2407 or DA Form 5504) and reports the failure to his/her maintenance support unit. The 2407/5504 should provide as much detail as possible with respect to the problem. The defective LRU is turned in to the user's maintenance support facility where an LRU will be issued from the Authorized Stockage List (ASL).
2. The maintenance support unit contacts GDC4S and reports the equipment failure.

Phone numbers: CONUS 1-877-247-7711  
OCONUS 1-508-880-4400 (to U.S.)  
011-49-6251-64071 (to Germany)  
E-mail address: chs2-warranty@gdc4s.com

3. GDC4S will assign an RMA number to the request and designate which RSC the equipment is to be sent.

**NOTE**

RMAs are used by GDC4S for tracking the status of repairs.

4. The maintenance unit will process the equipment for shipment to the RSC referencing the RMA#. This process includes:
  - a. Determining the method of shipment to use, keeping in mind the same mode will be used by the RSC to return the repaired item(s).
  - b. Ensuring proper packaging is used to prevent damage during shipping. When possible, original packaging or hard transit cases should be utilized.

**NOTE**

Repair costs due to improper or inadequate packaging are borne by the sender.

- c. Ensuring a copy of the DD Form 2407 or DA Form 5504 is included with the equipment; documenting the problem and RMA number.
5. Upon receipt of the item, the RSC inspects & tests the equipment. The accompanying DA Form 2407 or DA Form 5504 should have a SAMS number assigned. The RSC will enter the SAMS number into their database along with the RMA number.
6. Repairs covered by warranty will be completed within 72 hours from the time the RSC received the equipment; then will be shipped back to the unit.
7. Repairs suspected by the RSC to be Other Than Fair Wear & Tear (OTFWT) are not covered under warranty and must be evaluated by Government personnel in the PM CHS logistics (LOG) section. The following steps are taken to process out of warranty repairs:
  - a. The RSC sends GDC4S a detailed written evaluation accompanied by digital photographs taken at various angles of the damage.

- b. GDC4S electronically transmits the pictures & statement to PM CHS LOG Support.
- c. PM CHS LOG personnel evaluates the damage and notifies GDC4S of their assessment. (NOTE: Determination of OTFWT repairs must be made by government representatives and resolved prior to the start of any repair work at the RSC).
- d. If damage is determined to be OTFWT, GDC4S prepares a quote of the repair cost and sends copies of the quote to the customer and the PM CHS LOG Section.
- e. Upon notification, the USER must decide whether or not to have the item repaired.
  - (1) If the user decides NOT to authorize repairs; they must notify the GDC4S Hotline of their decision and the equipment will be returned to the sender at GD's expense. This should be done within 30 days of receiving the repair quote. In CONUS Call: 1-877-247-7711, Out of CONUS Call: 1-508-880-4400 or E-mail: chs2-war-ranty@gdc4s.com.
  - (2) If the user AUTHORIZES repairs; payment can be made using their Unit IMPAC Credit Card, or a Military Interdepartmental Purchase Request (MIPR). Regardless of the method of payment, repairs cannot begin until the funds have been received and processed.

To pay for repairs using the Unit IMPACT Credit Card, call the GDC4S Hotline to effect payment.

To pay for repairs using the Military Interdepartmental Purchase Request (MIPR), first ensure the MIPR contains the following information:

RMA Number

Point of Contact's name, phone number & fax number

Then FAX copies of the MIPR to:

PM TOCs/AMDCCS (Attn: Linda Funghi) FAX # DSN 922-2613, COML: (256) 774-6823

PM CHS (Attn: Cindy Natale) FAX # DSN 992-0833, COML: (732) 532-0833

Once the MIPR is received at PM TOCs/AMDCCS it will be processed and GDC4S notified that payment has been received. Repairs are completed and the equipment is returned to the unit.

## General Dynamics Support Centers

General Dynamics Regional Support Centers (RSCs) maintain a large inventory of repair parts and technical expertise. All the RSC locations identified below repair PM CHS hardware.

### Regional Support Centers

Ft Bragg, NC	Ft Hood, TX	Ft Lewis, WA	Bensheim, Germany
General Dynamics, RSC Bldg 8-6812 Butner & Letterman Streets Ft Bragg, NC 28307 Telephone: 910-497-7900 Fax: 910-497-1911	General Dynamics, RSC Bldg 3820 3800 Terminal Ave. Ft Hood, TX 76544 Telephone: 254-532-2927 Fax: 254-532-2933	General Dynamics, RSC Bldg 9564 Ranier Drive Ft Lewis, WA 98433 Telephone: 253-964-5160 Fax: 253-964-5077	U. S. AMC CECOM EUROPE MSE RSC Berliner Ring 26 64625 Bensheim, Germany Telephone: 011-49-6251-64071 Fax: 011-49-6251-64078 DSN: 380-4053/4054

**PART 2 - WARRANTY INFORMATION (HARDWARE FIELDIED AFTER TO 1 AUGUST 2005) - Continued****General Dynamics Support Centers - Continued**

<b>Korea Satellite Support Center*</b>		<b>Other Support Center</b>
<b>Fedex Address</b>	<b>U.S. Mail Address</b>	<b>Taunton, MA</b>
RSC Korea TAT Office PSC 307, BOX 4 Camp Casey, Korea Attention: Jim Story DSN: 730-2819 Civ: 351-869-2819 If calling from the U.S. 011-351-869-2819	RSC Korea TAT Office APO AP 96244-0004 Camp Casey, Korea Attention: Jim Story DSN: 730-2819 Civ: 351-869-2819 If calling from the U.S. 011-351-869-2819	General Dynamics 275 John Hancock Road Taunton, MA 02780 Attention: Bob Basteri Telephone: 1-877-247-7711 Fax: 508-880-1623

\*The Korea Support Center only provides a “Best Effort” in meeting the 72-hour turn-around-time.

**Addendum to the Common Hardware Systems (CHS) Logistics Support Program Plan for Operation Iraqi Freedom (OIF)/Operation Enduring Freedom (OEF)****CHS Logistics Support Priority**

The over-riding priority of the CHS Logistics Support Program is to provide rapid and effective repair capabilities for all equipment users in the Southwest Asia (SWA) Theater in support of OIF/OEF.

**CHS Equipment Repair Facility**

Upon determination that beyond unit level repair is required the defective CHS equipment should be evacuated to the Camp Victory satellite support center in Baghdad, Iraq. This facility is being stood up to consolidate CHS repair operations for OIF/OEF in SWA. The effective date for this facility is 12 June 04. The following information is provided for this facility:

<b>Mailing Address</b>	<b>Shipping Address</b>	<b>Driving Directions</b>
General Dynamics HHC 3rd SIG. BDE Bldg 126A Camp Victory, Iraq 09342 Tel: DSN 302 557-0147	General Dynamics Bldg 126A Camp Victory, Iraq 09342 Attn: CHS Repair Facility Tel: DSN 302 557-0147	Take main road to front gate. Turn onto Sapper Street. At end of Sapper Street, turn right onto Guardian Lane.

The satellite facility that was at Camp Arifjan Kuwait will be closed and moved up to Camp Victory. Any equipment that is sent into Camp Arifjan will be rerouted to Camp Victory. The plan is to repair as many CHS equipment at Camp Victory as possible. The 72-hour CHS-2 contractual turn-around-time is understood to be a “Best Effort” goal for repairs performed at Camp Victory. Equipment that can not be repaired at Camp Victory will be sent to one of the CHS Regional Support Centers (RSCs). The provisions for warranty and OTFW&T repair described in the CHS Logistics Support Program Plan apply to this addendum as well.

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**REPORTING SOFTWARE/HARDWARE PROBLEMS**

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## **INTRODUCTION**

This work package describes how to report M32 LHMBC software or hardware problems.

## **REPORTING CRITERIA**

### **NOTE**

To solve a software or hardware problem, detailed information concerning the problem is required.

The following information is required.

1. Point of Contact (POC).
2. Unit.
3. Telephone number for POC.
4. E-mail address for POC.
5. Location when problem occurred.
6. Time and date when problem occurred.
7. Serial Number on LHMBC.
8. Version and Ballistic Kernel (BK) of LHMBC software.
9. Description of problem.
10. Description of error message(s) or Alert(s) received (if applicable).
11. Was the problem repeatable?
12. If applicable, list any digital systems that were in communication with the LHMBC at the time of problem.

Mail or e-mail the above information to:

Product Manager, Mortar Systems  
Attention: SFAE-AMO-CAS-MS  
Picatinny, NJ 07806-5000

E-mail <mfchelp@pica.army.mil>

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**OPERATOR AND UNIT MAINTENANCE**  
**LIGHTWEIGHT HANDHELD MORTAR BALLISTIC COMPUTER, M32**  
**(NSN 7021-01-521-1611, PN 13007892)**  
**MARINE CORPS INVENTORY SHEET**

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**GENERAL**

This work package lists the Marine Corps inventory requirements.

**INVENTORY SHEET****NOTE**

Commanders will maintain sufficient quantity to support mission requirements.

INVENTORY SHEET NAME OF EQUIPMENT: M32 LHMBC																	
ITEM NO.	STOCK NUMBER	ITEM IDENTIFICATION	UNIT OF MEAS	QTY USED IN UNIT	MONTH												REMARKS

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<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> <small>For use of this form, see AR 25-30; the proponent agency is ODISC4.</small>						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE	
TO: (Forward to proponent of publication or form) (Include ZIP Code)						FROM: (Activity and location) (Include ZIP Code)			
<b>PART I - ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS</b>									
PUBLICATION/FORM NUMBER <b>TM 9-1220-252-12&amp;P</b>						DATE <b>20 Jul 05</b>		TITLE <b>Lightweight Handheld Mortar Ballistic Computer (LHMBC), M32</b>	
ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO.*	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON <i>(Provide exact wording of recommended changes, if possible).</i>			
1						Page 0001 00-2, CPC para. Change "Aberdeen Proving Ground, MD 21010" to read "Rock Island, IL 61299". Reason: Wrong Address.			
2						Page 0002 00-1. Add callout "3" to the illustration. Reason: Callout missing.			
SAMPLE									
<small>* Reference to line numbers within the paragraph or subparagraph.</small>									
TYPED NAME, GRADE OR TITLE						TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION		SIGNATURE	

<b>RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS</b> <small>For use of this form, see AR 25-30; the proponent agency is ODISC4.</small>						Use Part II (reverse) for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/Supply Manuals (SC/SM).		DATE	
TO: (Forward to proponent of publication or form) (Include ZIP Code) <b>AMSTA-LC-LMIT/TECH PUBS, TACOM-RI</b> <b>1 Rock Island Arsenal</b> <b>Rock Island, IL 61299-7630</b>						FROM: (Activity and location) (Include ZIP Code)			
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<b>TO:</b> <i>(Forward direct to addressee listed in publication)</i> <b>AMSTA-LC-LMIT/TECH PUBS, TACOM-RI</b> <b>1 Rock Island Arsenal</b> <b>Rock Island, IL 61299-7630</b>	<b>FROM:</b> <i>(Activity and location) (Include ZIP Code)</i>	<b>DATE</b>
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<b>PART II - REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS</b>
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PUBLICATION NUMBER			DATE		TITLE			
PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

<b>PART III - REMARKS</b> <i>(Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)</i>
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TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
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For use of this form, see FM 3-22.91; the proponent agency is TRADOC


APD V1.00

By Order of the Secretary of the Army and Commandant of the Marine Corps:

PETER J. SCHOOMAKER  
*General, United States Army*  
*Chief of Staff*

JAMES M. RIPLEY  
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Marine Corps Systems Command

Official:

  
SANDRA R. RILEY  
*Administrative Assistant to the*  
*Secretary of the Army*  
0515402

**DISTRIBUTION:** To be distributed in accordance with the initial distribution number (IDN) 401218 requirements for TM 9-1220-252-12&P

# THE METRIC SYSTEM AND EQUIVALENTS

## LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meter = 0.3937 Inch  
1 Decimeter = 10 Centimeters = 3.94 Inches  
1 Meter = 10 Decimeters = 100 Centimeters  
= 1000 Millimeters = 39.37 Inches  
1 Dekameter = 10 Meters = 32.8 Feet  
1 Hectometer = 10 Dekameters = 328.08 Feet  
1 Kilometer = 10 Hectometers = 1000 Meters = 0.621 Mile  
= 3280.8 Feet  
Millimeters = Inches times 25.4  
Inches = Millimeters divided by 25.4

## WEIGHTS

1 Centigram = 10 Milligrams = 0.154 Grain  
1 Decigram = 10 Centigrams = 1.543 Grains  
1 Gram = 0.001 Kilogram = 10 Decigrams = 1000 Milligrams  
= 0.035 Ounce  
1 Dekagram = 10 Grams = 0.353 Ounce  
1 Hectogram = 10 Dekagrams = 3.527 Ounces  
1 Kilogram = 10 Hectograms = 1000 Grams = 2.205 Pounds  
1 Quintal = 100 Kilograms = 220.46 Pounds  
1 Metric Ton = 10 Quintals = 1000 Kilograms  
= 1.1 Short Tons

## LIQUID MEASURE

1 Milliliter = 0.001 Liter = 0.034 Fluid Ounce  
1 Centiliter = 10 Milliliters = 0.34 Fluid Ounce  
1 Deciliter = 10 Centiliters = 3.38 Fluid Ounces  
1 Liter = 10 Deciliters = 1000 Milliliters = 33.82 Fluid Ounces  
1 Dekaliter = 10 Liters = 2.64 Gallons  
1 Hectoliter = 10 Dekaliters = 26.42 Gallons  
1 Kiloliter = 10 Hectoliters = 264.18 Gallons

## SQUARE MEASURE

1 Sq Centimeter = 100 Sq Millimeters = 0.155 Sq Inch  
1 Sq Decimeter = 100 Sq Centimeters = 15.5 Sq Inches  
1 Sq Meter (Centiare) = 10 Sq Decimeters  
= 10,000 Sq Centimeters = 10.764 Feet  
1 Sq Dekameter (Are) = 100 Sq Meters = 1076.2 Sq Feet  
1 Sq Hectometer (Hectare) = 100 Sq Dekameters  
= 2.471 Acres  
1 Sq Kilometer = 100 Sq Hectometers = 1,000,000 Sq Meters  
= 0.386 Sq Mile

## CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.061 Cu Inch  
1 Cu Decimeter = 1000 Cu Centimeters = 61.02 Cu Inches  
1 Cu Meter = 1000 Cu Decimeters  
= 1,000,000 Cu Centimeters = 35.31 Cu Feet

## TEMPERATURE

$5/9 (^{\circ}\text{F} - 32^{\circ}) = ^{\circ}\text{C}$   
 $(9/5 \times ^{\circ}\text{C}) + 32^{\circ} = \text{F}$   
-35° Fahrenheit is equivalent to -37° Celsius  
0° Fahrenheit is equivalent to -18° Celsius  
32° Fahrenheit is equivalent to 0° Celsius  
90° Fahrenheit is equivalent to 32.2° Celsius  
100° Fahrenheit is equivalent to 38° Celsius  
212° Fahrenheit is equivalent to 100° Celsius

## APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>	<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches .....	Centimeters .....	2.540	Centimeters .....	Inches .....	0.394
Feet .....	Meters .....	0.305	Meters .....	Feet .....	3.280
Yards .....	Meters .....	0.914	Meters .....	Yards .....	1.094
Miles .....	Kilometers .....	1.609	Kilometers .....	Miles .....	0.621
Square Inches .....	Square Centimeters .....	6.451	Square Centimeters .....	Square Inches .....	0.155
Square Feet .....	Square Meters .....	0.093	Square Meters .....	Square Feet .....	10.764
Square Yards .....	Square Meters .....	0.836	Square Meters .....	Square Yards .....	1.196
Square Miles .....	Square Kilometers .....	2.590	Square Kilometers .....	Square Miles .....	0.386
Acres .....	Square Hectometers .....	0.405	Square Hectometers .....	Acres .....	2.471
Cubic Feet .....	Cubic Meters .....	0.028	Cubic Meters .....	Cubic Feet .....	35.315
Cubic Yards .....	Cubic Meters .....	0.765	Cubic Meters .....	Cubic Yards .....	1.308
Fluid Ounces .....	Milliliters .....	29.573	Milliliters .....	Fluid Ounces .....	0.034
Pints .....	Liters .....	0.473	Liters .....	Pints .....	2.113
Quarts .....	Liters .....	0.946	Liters .....	Quarts .....	1.057
Gallons .....	Liters .....	3.785	Liters .....	Gallons .....	0.264
Ounces .....	Grams .....	28.349	Grams .....	Ounces .....	0.035
Pounds .....	Kilograms .....	0.454	Kilograms .....	Pounds .....	2.205
Short Tons .....	Metric Tons .....	0.907	Metric Tons .....	Short Tons .....	1.102
Pounds-Feet .....	Newton-Meters .....	1.356	Newton-Meters .....	Pounds-Feet .....	0.738
Pounds-Inches .....	Newton-Meters .....	0.11375	Kilopascals .....	Pounds per Square Inch .....	0.145
Pounds per Square Inch .....	Kilopascals .....	6.895	Kilometers per Liter .....	Miles per Gallon .....	2.354
Ounce-Inches .....	Newton-Meters .....	0.007062	Kilometers per Hour .....	Miles per Hour .....	0.621
Miles per Gallon .....	Kilometers per Liter .....	0.425	°Fahrenheit .....	°Celsius .....	$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \times 5/9$
Miles per Hour .....	Kilometers per Hour .....	1.609	°Celsius .....	°Fahrenheit .....	$^{\circ}\text{F} = (9/5 \times ^{\circ}\text{C}) + 32$

PN: 082528-000